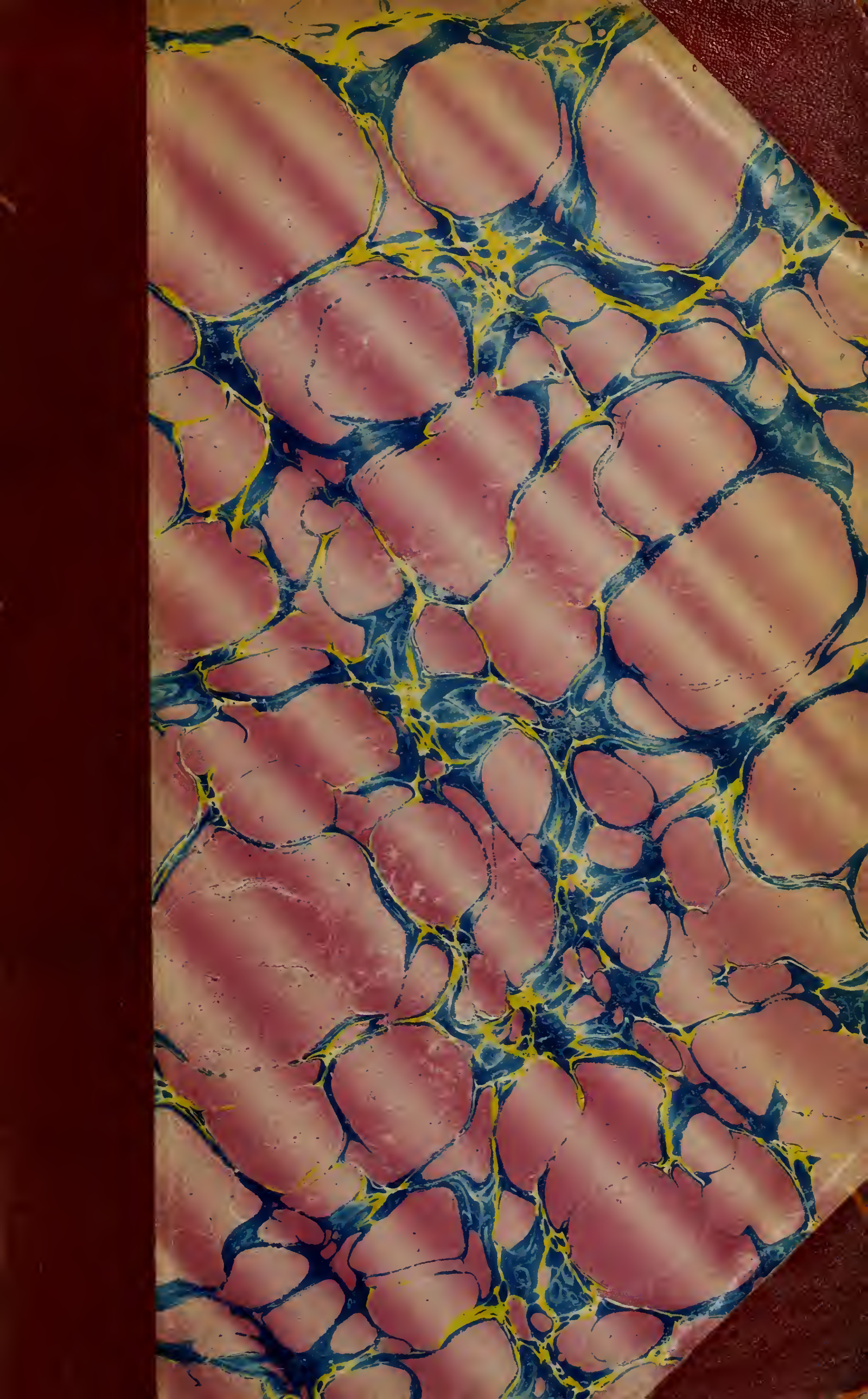

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ON THE MICRO-ORGANISMS IN HEMLOCK WATER.

BY GEO. W. RAFTER, M. A. S. M., M. AM. SOC. C. E.

[Read before the Rochester Academy of Science.]

By resolution of the Section of Microscopy I have been detailed to present to you this evening some of the results of a year's work in the study of the biology of the Hemlock water supply.

Hemlock lake, from whence the supply is derived, is situated twenty-eight miles south from Rochester, on the boundary between Ontario and Livingston counties. It is six and six-tenths miles in length and rather more than half a mile wide. Its shores are bold and steep, the hills rising on both sides to the height of several hundred feet, and on the western side the slopes are, to a great extent, still covered with a primeval forest of oak, ash, hemlock and chestnut.

The total drainage area, exclusive of the surface of the lake itself, is about 26,000 acres, and of this it is estimated that from 18,000 to 19,000 acres are in cultivation, the agricultural industries being of the usual diversified character peculiar to Western New York.

The geological formation of these bluffs is the Marcellus shale, and into this the basin of the lake extends to a depth of more than seventy feet.

The only constant tributary is the inlet at the south end and this brings the drainage of several miles of elevated valley lying to the south of the lake.

The quantity of water flowing into the lake by the inlet is less than one-half of that flowing out at the outlet, from which it has been inferred that the permanent supply is derived from deep seated springs. In confirmation of this view it has been noted that the water of the inlet is about three times as hard as the water of the lake itself and that it farther contains a larger percentage of organic matter.

A study of the discharge of the lake in conjunction with observations on the rain-fall leads moreover, to the conclusion that but a small proportion of any given rain runs off at once, but that finally a large percentage is received in the lake. This we may also infer to be fairly deducible from the geological conditions. We may take it therefore as proven that Hemlock lake water is mostly in the fullest sense spring water. The fact that there is no limestone in the region gives a water of a high degree of softness.

CHEMICAL ANALYSES.

Chemical analyses of Hemlock water were made by Professor Lattimore several times a month in the fall of 1876, and also from March, 1877, to February, 1878. The following is the mean of all the analyses made in 1877 in parts per 100,000 of water by weight.*

Inorganic Matter - - - - -	7.25
Organic and Volatile - - - - -	4.00
Free Ammonia - - - - -	0.00
Albuminoid Ammonia - - - - -	0.0004

In July, 1881, Prof. Leeds made an analysis of Hemlock lake water as follows.† His results are in grains per gallon, but for purposes of comparison I have carried them out to parts per 100,000 of water by weight as well.

	Grains Per Gallon.	Parts Per 100,000.
Free Ammonia - -	0.00087	0.00149
Albuminoid Ammonia - -	0.013	0.022
Oxygen Required - -	0.46	0.79
Nitrites - - - -	None	None
Nitrates - - - -	0.367	0.63
Chlorine - - - -	0.113	0.194
Total Hardness - -	3.20	5.48
Total Solids - - -	5.83	9.99
Mineral Matter - -	2.33	3.99
Organic and Volatile Matter -	3.50	6.00

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*Report on the Water Supply of the City of Rochester, by Prof. S. A. Lattimore, in the Annual Report of the Executive Board of the City of Rochester for 1878.

†Table giving composition of city waters in the United States, in the Journal of the American Chemical Society, 1881; also in the Annual Report of the Executive Board for 1881, by Prof. Albert R. Leeds.

INTERPRETATION OF ANALYSES.*

In order to compare different analyses, we need to understand just what the different items represent, as, for instance, the free ammonia is the measure of that portion of the nitrogenous matter which has already undergone decomposition.

The albuminoid ammonia is the measure of that part of the nitrogenous matter which has not been decomposed, but which is capable of undergoing decomposition.

Oxygen required will indicate the amount of oxygen required to oxidize the organic matter.

The nitrites and nitrates mark different stages in the oxidation of the nitrogenous organic matter already existing in the water, or, possibly the supply of nitrogenous salts from some external source.

When there is no reason to suppose the supply of nitrates from some external source, their occurrence would indicate that the water is undergoing or has undergone a process of natural purification. The nitrites and nitrates are, therefore, harmless of themselves, but they mark the possibility of dangerous organic contamination, and they probably act as the pabulum of micro-life.

The most striking point in the comparison of these analyses is the increase of ammonia both free and albuminoid from 1877 to 1881. This increase is such, indeed, as to explain in a striking manner the increase in life noted by Mr. Atwood in 1881.

Prof. Lattimore did not determine the nitrates, and we have, therefore, no means of comparing them.

The other determinations are not of special importance for present purposes.

PROF. LATTIMORE'S MICROSCOPICAL EXAMINATION.

At the time of making the above analyses Prof. Lattimore made an extended microscopical examination of this water and he states the result of such examination as follows:

"First—The amount of organic life existing in Hemlock lake water, whether in the mains, reservoirs or the lake itself, is exceedingly small. The number of species is small, and no species is represented by a large number of individuals. I have examined no other water supply which has not contained a larger, and usually a very much larger, proportion of organic life. * * * Our water supply is sparsely populated.

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*See article, Interpretation of Data, in Report on Schuylkill River, by Prof. Albert R. Leeds, in the Annual Report of the Philadelphia Water Department for 1883.

"Second—The variation observed from month to month in the species and number of individuals has been scarcely, if at all, perceptible. The single exception is that of a little *entomostracan-cyclops* which was slightly more abundant in the early summer.

"Third—The species of plants and animals living in Hemlock lake are those found only in the purest waters. Scarcely one of them is to be found in the stagnant water of ponds or ditches, which usually swarm with life during the summer, especially, and conversely the organisms characteristic of stagnant water are notably absent from the lake water.

"Fourth—The character of the bed of Hemlock lake and its surroundings furnish a reasonable account for this scanty life. Its water, almost entirely free from organic matter, as the chemical analysis so clearly shows, lacks the necessary pabulum for their subsistence, while the absence of marshy and weedy borders and the slight growth of aquatic plants do not furnish the conditions favorable to their multiplication."

The modern studies in biology indicate that nitrogenous food is necessary for the existence and development of most of the forms of infusorial life, especially for such as find their native habitat in impure and stagnant waters, and it seems to be a fair inference, that, in addition to nitrogenous organic matter, by itself furnishing the food of such organisms, there are farther certain conditions, as yet not very clearly defined, in which, what would otherwise be harmless organic matter, may, if in the presence of a nitrogen salt, and small quantities of phosphoric acid, become the pabulum of a rank growth of micro-life. Under such conditions we have the lake, for the time being, transformed into a culture fluid.

Under ordinary circumstances we should not expect to find phosphoric acid present in a potable water, its insolubility, coupled with the fact that it decomposes carbonate of lime, forming phosphate of lime as a precipitate, would render its presence, except in very minute quantity, impossible. Hemlock lake, however, contains almost no carbonate of lime, and the comminution of the commercial fertilizers (to the possible effect of which attention is called below) is such as to render it probable that enough phosphoric acid exists to furnish, in conjunction with the substances just referred to, all the elements of a nutrient culture fluid.

The chemical analyses made in 1876 and 1877 show an exceedingly small amount of nitrogen present, and likewise the microscopical study shows a correspondingly slight amount of life. Each, therefore, testifies to the correctness of the other, and it may be taken as proven beyond all question that in 1876 and '77 the Hemlock lake water was of a high degree of purity.

INCREASING CONTAMINATION.

There appears, however, to have been from that time to the present a gradually increasing contamination, which, having attracted my attention about two and a half years ago, I began a daily study with the microscope. The work growing in interest and importance, the Microscopical Section of the Academy of Science, at my suggestion, undertook a year ago to make a detailed study of our water supply from the biological standpoint, and this paper has for its object the setting before the Academy the results of our study to this date.

Previous to my own work in this direction, in addition to Prof. Lattimore's report, work had been done on the biology of Hemlock lake water by H. F. Atwood and Prof. John G. Allen, both Members of the Academy. Mr. Atwood presented a paper on the subject in 1881 and gave a list of about 70 forms which he had succeeded in identifying. This indicates a considerable increase in life since 1877, when Prof. Lattimore made a list of only 14.

At the present time there can be found in Hemlock lake water nearly every form of minute vegetable and infusorial life peculiar to the ponds, brooks and ditches of Western New York, and that this condition of affairs has not always existed is, we consider, fairly proven by the evidence adducted above.

PHYSICAL CHARACTERISTICS.

Attention has been called in a previous paper* to the fact that at Hemlock lake relatively *small* amounts of contamination will be *likely* to produce more serious effects than they would if the whole body of water were larger. It appears to be well established that a small body of water, lying as Hemlock lake does in a deep, narrow valley, has less purifying power than a larger body of water. This may be clearly conceived of by the consideration that natural purification is largely a matter of oxidation, such effect being chiefly produced by the absorption of oxygen from contact of the water with the air. On a large body every passing breeze causes an agitation of the surface, while at Hemlock lake, or any similarly situated body of water, it is only the sharp gale that greatly affects the surface. It would seem to follow, therefore, that under such conditions special care should be taken to *prevent* contamination.

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*On the Use of the Microscope in Determining the Sanitary Value of Potable Water, with Special Reference to the Biology of the Water of Hemlock Lake, by the present writer.

In order to set before you more clearly the real significance of the chemical analyses given above, I will discuss briefly some of the physical characteristics of the water, which it is important to understand in connection with the present investigation.

Hemlock lake has a length of 6.6 miles, a mean width of 0.6 of a mile, and a mean depth of about 40 feet. We find then

$$(6.6 \times 5{,}280) \times (0.6 \times 5{,}280) \times 40 = 4{,}415{,}938{,}560$$

as the contents of the lake in cubic feet, which may be taken for even figures at 4,400,000,000 cubic feet. The total content of the lake in pounds of water will be then,

$$4{,}400{,}000{,}000 \times 62.5 = 275{,}000{,}000{,}000 \text{ pounds.}$$

The drainage area, exclusive of the area of the lake itself, is roundly 26,000 acres, and over this area is an average annual rainfall of about 33 inches. Of this 48 per cent. is estimated as finding its way into the lake itself* during the whole year, while in the dry season only 11 per cent of the rainfall finds its way into the lake.

The mean area of the lake is something over 1,800 acres, but the amount of rain falling on this area is compensated for by the evaporation, one balancing the other, and hence it may be left out of the account. We have then the annual inflow from the drainage area as

$$0.48 \times 33 = 15.84 \text{inches} = 1.3 \text{ feet.}$$

The total annual inflow is, therefore,

$$26{,}000 \times 43{,}560 \times 1.3 = 1{,}472{,}328{,}000 \text{ cubic feet,}$$

which for even figures we will take at 1,472,000,000 cubic feet. This is the annual inflow. If the lake were empty the time required to fill it would be found by dividing the total content by the annual inflow, or, such time would be

$$\frac{4{,}400{,}000{,}000}{1{,}472{,}000{,}000} = 2.99 \text{ years.}$$

From this computation we farther derive the important conclusion that there can be a complete change of the water of Hemlock lake but once in three years. Therefore, it follows, that if any accidental or abnormal contamination takes place, its effects *may* remain for at least three years.

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*See tables and computations relative to rainfall and inflow and outflow of Hemlock lake, in Proceedings to Acquire Water Rights by the City of Rochester.

As stated above, the inflow during the dry months is only 11 per cent. of the rainfall during that time. These months are July, August, September and October. During these months the lake receives a very small quantity of water, so that by the first of November the surface of the lake has reached a point considerably below the mean elevation.

During these same dry months our studies with the microscope show, usually, a considerable activity of all kinds of minute life. Exceptions to this general principle, and reasons therefor, will, however, appear farther on.

Referring to Professor Lattimore's analyses of 1877, we find that albuminoid ammonia was present to the extent of 0.0004 parts in 100,000 parts of water, or the number of pounds of water containing 1 grain of albuminoid ammonia was

$$\frac{(100,000 \div 0.004)}{7,000} = 35,714 \text{ pounds.}$$

The total amount of albuminoid ammonia present in the lake was

$$\frac{275,000,000,000}{35,714} = \frac{7,000,000}{7,000} = 1,100 \text{ pounds.}$$

In 1881 Prof. Leeds found albuminoid ammonia present to the amount of 1 grain in every 641 pounds of water therefore, the amount in 1881 was

$$\frac{35,714}{641} = 55 \text{ times as great as in 1877.}$$

The total quantity in the lake in 1881 was, therefore,

$$1,100 \times 55 = 60,500 \text{ pounds.}$$

In 1881 nitrates were present to the amount of 0.63 parts in 100,000; or the total amount present in the lake was

$$\frac{275,000,000,000}{100,000} \times 0.63 = 1,732,500 \text{ pounds.}$$

Of organic and volatile matter there were present at the same time

$$\frac{275,000,000,000}{100,000} \times 6.0 = 16,500,000 \text{ pounds.}$$

While the above quantities are not absolute, they still serve to bring before the mind the real significance of the apparently infinitesimal quantities of a chemical analysis. They serve to show that the quantities representing the results of a chemical analysis are infinitesimal in appearance merely. They may still represent large quantities of matter. They also show why there should be a considerable increase of life in 1881 over the amount found in 1877.

The question farther arises as to the probable effect on the average purity of the water of the long period of time required for a complete change.

In general terms it seems, with our present information, a fair inference that the slow rate of change will, under normal conditions, be no detriment to the water. A process of natural purification and sedimentation will take place, and while normal conditions are maintained, the average standard of purity will be as high as it would be if the change were more rapid ; and at times the body of water must inevitably attain a condition of purity difficult to excel.

With abnormal conditions, however, the contrary proposition that there will be an increasing contamination is equally true. That such increasing contamination has actually taken place is abundantly proven by the evidence which we present to you.

COMMERCIAL FERTILIZERS.

This increased contamination admits of rational explanation. The reason for it is to be found in the increase of human habitations about the lake and possibly to some extent in an unnecessary carelessness on the part of the inhabitants. It is also found in the increased use of commercial fertilizers in agricultural operations. Some of these artificial manures contain large quantities of phosphates and nitrates, and these in solution, as already shown, are precisely what is needed to force an abundant growth of micro-life. The sooner the fact is generally recognized that the use of commercial fertilizers on the agricultural lands of the drainage area of a public water supply, will be likely to lead to an increase of minute life in such supply, the sooner we are likely to arrive at a rational solution of the question. The argument, moreover, applies principally to the commercial fertilizers and only in slight degree to what may be termed the natural fertilizers produced on the farms themselves. The concentration of the commercial fertilizer renders it very probable that on steep slopes, such as prevail around Hemlock, a portion of every application will find its way to the lake.

This question of the loss of nitrogenous manures is of great practical value in agriculture, as well as of importance in determining the contamination of a water supply, and experiments have been made showing the relative loss of different fertilizers when applied to soils. For instance, when nitrogen is applied to wheat in autumn in the form of ammonia salts, only one-third of the total amount supplied is recovered in the following crops. If, however, nitrate of soda is used and applied in the spring, one-half of the total amount supplied is recovered in the crop. The question at once arises, what becomes of the large amount of nitrogen which is not recovered into the crop? The answer to this is found in the results of a series of analytical determinations made by Dr. Frankland of the drainage water from several experimental wheat fields, from which it was found that when ammonia salts or nitrates are liberally supplied to land in the fall of the year, should there be much wet weather immediately following such application and during the succeeding winter, there will appear on analysis a large amount of nitrates in the water draining away from the field. The same result will follow the application of these fertilizers in the spring.*

These determinations were made from a series of analyses of the water flowing from underdrained fields specially prepared for the purpose of such experimentation. It was also found that the more nitrogen applied to the fields, the larger the proportion of nitrates in the drainage water.

It has further been found that for every 82 pounds of nitrogen per acre, applied in the form of ammonia, there was, for every inch of rain passing through the drains in January, a loss of 8.5 pounds of nitrogen.

The loss of nitrogen with the drainage-water is therefore very large and the experiments fully account for the considerable proportion which is not recovered with the crop.

The fact that the commercial fertilizers are used on the Hemlock drainage area, in conjunction with the above leads to some conclusions of value relative to the increase of minute life in Hemlock lake, as for instance :

1. Usually the micro-life is much less plentiful in winter than in summer. During the winter of 1886–87, however, there was as much, and, at times, more life than in either the preceding or following summer. The rainfall records indicate a heavy rainfall in October and November, 1886.

2. At the present time and for several months past the amount of life has been unusually light, less than at any previous time since I first began this study, while the rainfall for October, November and December, 1887, was nearly nothing.

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*See Article, Mannre, in ninth edition of the Encyclopaedia Brittanica.

3. The evidence is gradually accumulating that the conditions under which nitrites are converted into nitrates are such as require the presence of minute life. We may infer, therefore, that in the first case (1) the increase of micro-life marked what was probably an important chemical change; while in the second case (2) the decrease in the amount of such life stands as proof of the essential completion of a chemical change.

In the light of the above it seems to be a safe conclusion that in one case the heavy rainfall has brought into the lake not only the washings and drainings of all the human habitations in the drainage area, but has also washed to the lake a considerable proportion of any commercial fertilizer which may have been applied to the wheat fields of the area, such increase of contaminating material being marked by an increase in the micro-life.

In the other case the absence of fall rains and consequent decrease of the contamination is equally marked by diminished micro-life.

In further confirmation of the essential truth of this position it is noted that the gradual decomposition of farm-yard manures yields the nitrogenous principle slowly and there is consequently small waste from such manures. Their use on the drainage area of a public water supply will be, therefore, less harmful than the use of the concentrated artificial fertilizers.

We are led, therefore, to conclude that on drainage area of narrow valleys and sharp slopes, even a very moderate use of the commercial fertilizers must inevitably lead to a considerable increse of the micro-life.

It is matter of regret that we have not at hand reliable data as the basis of an estimate of the probable amount of contamination due to the use of the commercial fertilizers. In the absence of such data we can only submit for your consideration general estimates based upon the known characteristics of Western New York farming.

We will assume the area actually in cultivation at 18,000 acres, with an annual use of fertilizers at the rate of 200 pounds per acre on one sixth of the total acre in cultivation, or on 3,000 acres.

This gives an annual use of fertilizers to the amount of

3,000 x 200=600,000 pounds.

Of this we may assume a loss of 25 per cent, or 150,000 pounds annually. From the fact that the whole body of water changes but once in three years, it follows that if the nitrogenous or other matters so lost are at all stable in their composition there must be present in the lake at any given time the losses not for one year but for three years ; or on the above assumption we have 450,000 pounds and not 150,000 pounds constantly present, as representing the loss from the assumed use of commercial fertilizers.

Such an amount, even though only about one-fourth of the total amount actually found by Prof. Leeds, in 1881, would represent still, by the chemical standards, some degree of pollution,* and it is evident, therefore, that we could considerably reduce our estimate of the amount of fertilizer annually applied, and still show results which must in the nature of things produce important effects upon the purity of the water.

CHEMICAL VERSUS MICROSCOPICAL ANALYSIS.

As I have occupied your attention for a considerable time with matters which are largely chemical in their nature, I desire before proceeding to a description of the various forms, to briefly indicate my views as to the relative place of chemical and microscopical studies in water analysis.

There seems to be a rapidly-growing opinion, among those competent to judge, that chemical analysis, alone, is an exceedingly unreliable basis upon which to estimate the sanitary value of a potable water. So much so, indeed, that chemists, who have made water analysis a specialty, do not at the present time consider an examination complete, until, in addition to the chemical analysis, they have also made a biological analysis. The biological analysis, however, in order to be of any great value, should extend over considerable periods of time, as only by such continuance can the period of recurrence of the different forms of micro-life be determined.

As to the value of chemical analysis alone, the following, by Dr. Stevens, is of interest :† "It is perhaps enough to say, that a chemist is not of necessity a sanitarian, nor is his work the most important basis upon which a sound or safe conclusion is built as to the proper hygienic value of water for potable uses. This certainly

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*See Frankland's Water Analysis, page 36: "Upland surface waters are commonly free from nitrates and nitrites or contain but a mere trace. In them the range of nitrogen in this form is from *nil* to about 0.05, with an average of about 0.009 part. Surface waters from cultivated districts show an average of 0.25 part, ranging from *nil* (which occurs but seldom) to 1.0 part. * * * * The range in deep wells is from *nil* to 3.0 parts, and in spring waters about the same, with an average of about 0.4 in 100,000 parts of water in both cases."

†"True Value of Chemical Analysis in Determining the Hygienic Purity of Potable Water;" paper by Thad. M. Stevens, M. D., in Transactions American Public Health Association for 1884.

shows the fallacy of making a chemical standard of purity for such waters until at least greater certainty is attained in such examinations."

Dr. Chas. Smart, who, as analyst for the National Board of Health, has had abundant experience, says:* "The pursuit of the elements of organic matter has carried the analysts past the real object in view; but it is time that their retorts and combustion tubes should give place, in part, at least, to the microscope and culture experiments. These offer the best prospects of a solution of that difficult sanitary problem—the quality of our water supplies. Ultimately they will probably render the chemical methods unnecessary. By working in this direction the analysts will prepare themselves for the change of methods, while their labors will undoubtedly hasten the time when they will be able to give an opinion embodying certainties, instead of probabilities; when they will be able to say with truth, that a given sample of water is wholesome or unwholesome, as the case may be."

My own studies albeit of a somewhat superficial character have been such as to impress me with the essential truth of the conclusions above expressed by Drs. Stevens and Smart, and it was largely with a view of testing the value of such conclusions that the systematic study of Hemlock lake was undertaken.

Attention may be called, moreover, to the general proposition that the chemical methods are so refined in their nature that a slight error is liable to invalidate the results; whereas the microscopic analysis has the advantage of making the bulk of the organic contaminating material visible to the sense of sight. In general terms we may say it removes the determination of the contamination from the realm of the physical abstract to that of the physical concrete.

The advantage of this will readily appear to all who have attempted to draw conclusions and trace relations between columns of figures, representing quantities of matter apparently so minute as to be only expressible at the third and fourth decimal place.

So long, however, as the system of biological analysis is not fully developed it is undoubtedly true that the two should go together.

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*"On the Present and Future of Sanitary Water Analysis, paper by Major Chas. Smart, M. D., U. S. A.; also in Transactions American Public Health Association for 1884.

PERIOD OF RECURRENCE.

Nearly one hundred and fifty forms are now known to this Section by name, and there are probably one hundred forms known to the Section by sight which have not been identified. Independent, therefore, of the sanitary value of such an investigation, this work has about it the absorbing interest which always attaches to a journey into new and hitherto unexplored regions. In addition to adding materially to the stock of knowledge of our water supply, there is a fair probability that when the work is concluded we shall have made very considerable additions to the stock of knowledge of this subject possessed by the world at large.

Not the least interesting fact brought out is the recurrence of certain forms at definite seasons of the year. In January and February every glass of Hemlock water contains a number of specimens of the magnificent entomostracan, *Diaptomus pallidus.* In April and May the generations of *Cyclops*, *Bosmina* and *Chydorus* appear, and as they disappear in July and August the procession is kept up by countless numbers of *Sida crystallina* and smaller numbers of several species of the genus *Daphnia.* Again in December and January we have the diatoms, *Astrionella formosa*, *Cyclotella operculata*, and *Stephanodiscus Niagaræ* in countless number, while in midsummer hardly a single individual of these species can be seen.

To show the relation which subsists betwten the period of recurrence in our water supply of these minute animals and plants is a part of the task which this Section has undertaken to perform.

ETHICAL ASPECTS.

Moreover, this work has ethical aspects of no insignificant value. The delicate manipulation required to observe the life-process of an animal only $\frac{1}{100}$ of an inch in length, and in some cases many times smaller even, is in itself a source of perpetual improvement to the serious student of natural history. As for myself I confess to a feeling of sadness and disappointment as poignant as any ever experienced when in an unlucky moment I have, in attempting to adjust a life cage, succeed only in crushing the delicate captive within. At such a time one realizes that through the whole round of nature's mysterious domain there is an immutable law of chance against which the strongest, whether representing the infinitely small or the infinitely great, must at times rebel in vain. These biological studies have therefore humane tendencies of value to us all.

SCIENTIFIC AND COMMERCIAL VALUE.

They also have scientific and commercial value as is shown by the following: Filterings have been taken at several different points in the city and a study of these filterings in connection with a plan of the pipe distribution system has thrown light on some important points, namely, the fact has been clearly brought out that in the city mains there is an irregular distribution of life, some parts of the distribution system being at times almost entirely free from any forms whatever, while in other places many different species are abundant. It is also found that particular forms are frequently present in one locality and at the same time entirely absent in another.

This collecting of minute life in schools has been observed in the case of certain of the entomostraca in lakes and ponds. For instance *Diaptomus sanguineous* is of blood-red color, and the blood-red appearance of the surface of ponds and lakes, which has been occasionally noticed, is probably due to the presence of vast schools of this crustacean. *Daphnia pelex* is occasionally found of a dirty red color, and Swammerdam and Baird have both observed the phenomenon in question. Baird says:* "The myriads necessary to produce this effect is astonishing, and it is extremely interesting to watch their motions. On a sunshiny day, in a large pond, a streak of red, a foot broad and ten or twelve yards in length, will suddenly appear in a particular spot, and this belt may be seen rapidly changing its position, and in a short time wheel rapidly around the pond. Should the mass come near enough the edge to allow the shadow of the observer to fall upon them, or should a dark cloud suddenly obscure the sun, the whole body immediately disappear, rising to the surface again when they have reached beyond the shadow, or as soon as the cloud has passed over."

While it is thus well known that some species of entomostraca go in large schools, it has not been, so far as I can ascertain, previously observed that diverse species of minute life are similarly distributed in the mains of a public water supply. It is also found that there is a much larger proportion of life in the water in those parts of the city where the pipe distribution system is known to be deficient, than occurs along, or, in the immediate vicinity of the principal feeding mains, and that at dead ends and in long lines of mains without proper circulation there are to be found the most numerous colonies of all.

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*Baird's British Entomostraca, Page 78.

From this several conclusions of value are derived :

First : That Hemlock lake water, as it comes to the city, contains not only the germs of numerous forms of infusorial life, but that it contains the nurtient principle necessary to the development of such forms.

Second : The considerable diversity of forms which are found indicates a corresponding diversity in the quality of the nutrient principle.

Third : The profusion of forms found in dead-ends and in mains with inadequate circulation indicates that light is not essential to the development of the lower forms of life.

Fourth : The City Water Deparment has been aware for several years that dead-ends require frequent flushing, made manifest to the department by frequent complaints from consumers as to the quality of the water at such points. The result of our study may, therefore, stand as justification of the expense of a systematic flushing of mains by that department.

Fifth : The farther conclusion may be drawn not only by the management of our own water works, but by all engineers engaged in designing and constructing water works, that thorough circulation is of prime importance, and this work appears to furnish justification of considerable additional expenditure in order to secure thorough circulation in every part of a pipe-distribution system.

Sixth : The question of covered versus open reservoirs has been considerably discussed, not only by engineers, but by chemists and biologists, and widely vary opinions have been expressed. The opinion has been generally held, however, that covered reservoirs are necessary to prevent the development of life in standing water, and in England large amounts have been expended in constructing reservoirs with masonry coverings. Our study of the development of life in the mains appears to justify the opinion that at present the utility of such expensive constructions is not fully proven.

Concluding this part of the subject your attention is directed to the fact that this work has therefore in addition to its purely scientific aspect a fair proportion of commercial value.

SANITARY CONSIDERATIONS.

The question will at once arise are any of the forms known to exist in the water of Hemlock lake such as really indicate organic impurity, and are they farther such as are prejudicial to the public health? A complete answer to this question would involve tracing the life-history of each and every form, and this cannot at present be done. We have, however, certain known points established from which we may reason to definite conclusions. For instance certain algæ are known to produce diarrhœal difficulties, and an excessive amount of certain algæ present in a public water supply has been accompanied by an alarming mortality of the fish. Several water supplies have been at times very offensive by reason of the presence of a large amount of sulphureted hydrogen caused by the decomposition of an alga.* Again the presence of nematoid worms and small leaches may give rise to certain grave disorders of the human system, which we cannot go into here. There are, however, numerous forms, both animal and vegetable, to which no special effect on health can, at present, be assigned. In any case a knowledge of their existence is important as indicating the presence of organic impurities or as possibly indicating putrefaction, and even though we have as yet no evidence that they are harmful still we would not hesitate to condemn a water found swarming with many of the lower forms of life.

In order to set before you some of the main facts of interest which the Section has come into possession of during this study, I will discuss briefly the various classes and more interesting forms, beginning with those lowest in the scale.

Elementary matter has three forms, protoplasm, or that which has not yet differentiated into either animal or vegetable; protozoa, or that form which has begun to assume the functions of an animal, and protophyta, or that which has begun to be a plant.

FRESH WATER SPONGES.

Beginning with the protozoa, we have the fresh water sponge present in our water supply in considerable quantity. At the present time the spicules of what are probably *Spongilla fluviatilis* may be found in every filtering. Except in one particular the fresh water sponges resemble in general appearance many of those of a marine habitat. This is the presence of a statoblast or more properly gemmule in the fresh water sponges, while the marine are marked by its absence. These gemmules are spherical in form and about $\frac{1}{50}$ inch in diameter. The skeleton of the sponge, upon which the slime-like sponge flesh or sarcode is supported, is composed of silicious spicules slightly bound together by a small quantity of firmer sarcode. These spicules average about $\frac{1}{100}$ inch in length, and are arranged in bands made up of several spicules lying side by side, overlapping at their extremeties. Besides the skeleton spicules there is another class known as the flesh spicules, either lying upon the outer film, or lining the canals in the deeper portion of the sponge. These are usually much smaller than the skeleton spicules, and are not bound together in any way. A third class of spicules are embedded in the crust of the gemmules, and may be regarded as their defensive coating.

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*Paper on "Algæ in a Water Supply," by A. Fteley, C. E., in supplement to the Report of the Massachusetts State Board of Health, Lunacy and Charity, for 1879; also paper by Dr. W. G. Farlow on "Some Impurities of Drinking Water, Caused by Vegetable Growths," in the same Report.

The fresh water sponges may be frequently found in rapid running water, attached to large loose stones, or the underside of timbers. They are also found on water-logged or floating timber and submerged stumps, and many of the species grow in deep water from ten to twenty feet or more below the surface. The different species attain their maturity between July and December, but they may be found at all seasons.

The fresh water sponges are widely distributed. So far as known most of the species prefer pure water, but some of them have been found to flourish in water unfit for domestic use. Their presence has been known to give water a very disagreeable odor and taste, as was especially noticeable at Boston in 1881, when it was found that a large quantity of decomposing sponge in one of the reservoirs was the cause of the trouble. Nevertheless, the fact that they exist in a public water supply need not be the cause of serious apprehension. It is not known that they have ever been the direct cause of disease.*

RHIZOPODS.

Several rhizopods have been identified in filterings from the city mains, and of this class of life it can only be said that they must be taken when present in any quantity as indicating considerable impurity. Their natural habitat is to be found in the ooze along muddy borders and in the interstices of sphangnum growing in the margins of swamps. As a general statement, it may be said, therefore, that they are never found in quantity in water about the purity of which there is no question.

The rhizopods are, however, among the most interesting forms for study with which we are familiar. They are simply a soft mass of protoplasm with neither mouth, stomach nor intestines. Dr. Leidy says: "Without trace of nerve elements, and without definite, fixed organs of any kind, internal or external, the rhizopod—simplest of all animals, a mere jelly speck—moves about with the apparent purpose of more complex creatures. It selects and swallows its appropriate food, digests it, and rejects the insoluble remains. It grows and reproduces its kind. It evolves a wonderful variety of distinctive forms, often of the utmost beauty, and, indeed, it altogether exhibits such marvelous attributes that one is lead to ask the question, in what consists the superiority of animals usually regarded as much higher in the scale of life."

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*See paper, "Contributions Towards a Synopsis of the American Forms of Fresh Water Sponges," etc., by Edward Potts, in the Proceedings of the Academy of Natural Sciences of Philadelphia, Part II, April—August, 1887.

Dr. Carpenter writes as follows of the rhizopods: "The physiologist has here a case in which those vital operations which he is accustomed to see carried on by an elaborate apparatus are performed without any special instrument whatever, a little particle of apparently homogeneous jelly, changing itself into a greater variety of forms than the fabled Proteus, laying hold of its food without members, swallowing it without a stomach, appropriating its nutrient material without absorbent vessels or a circulating system, moving from place to place without muscles, feeling (if it has any power to do so) without nerves, propagating itself without genital apparatus—and not only this, but in many instances forming shelly coverings of a symmetry and complexity not surpassed by those of any testaceous animals."

As yet only a small number of rhizopods have been seen in Hemlock lake water, but a study of the swamp at the south end of the lake would doubtless reveal a considerable colony of them.

INFUSORIA.

Something like twenty species of infusoria are known to exist in Hemlock lake water as received here at Rochester, and some of these are found in considerable numbers in nearly every filtering. Probably the most numerous, both as to number of individuals and and species are the *Vorticellæ*. *Euglena* has also been seen a few times in considerable quantity. *Paramecium* has been seen a few times in considerable quantity, but usually this representative filth infusorian is not found in fresh filterings. It is only after the filtering has stood and become stagnant that paramecium appears. Two species of stentor have also been observed, but never in quantity. *Ceratium longicorne* and *Peridinium tabulatum* are two interesting infusoria found at times in vast quantities.

Trachelocerca olor is another filth infusorian occasionally seen. It has considerable interest from the fact that it was one of the earliest infusorial forms known, having been figured and described by Baker in 1752. They are distinguished by a long neck, and as seen swimming with neck extended and moving from side to side they greatly resemble swans. Kent says he has frequently observed that two individuals of this species are almost invariably found in close proximity, and appear to be guided in their movements by a certain community of action. They are always found in masses of decaying confervæ and vegetable debris. *Amphileptus anser* is another interesting form usually found among decaying vegetation.

The other species of infusoria have thus far been found only occasionally. The presence of any considerable amount of most of the species of infusoria must be taken as indicating serious contamination.

FRESH WATER POLYPES.

Of fresh water polypes, we have the two common species of hydra, namely, *Hydra vulgaris* and *Hydra viridis*. These curious creatures deserve more than passing notice, not only because of their great frequency, but because of their great tenacity of life and remarkable manner of reproduction. The hydra is large enough to enable all of its operations to be watched with the naked eye, or by the assistance of a magnifying glass of moderate powers. Its body is composed of jelly-like sarcode, and varies in color according to species, the hydra virdis being grass green. The posterior end of the body is furnished with a sucking apparatus, by which it attaches itself at will. The anterior portion has a mouth, around which the tentacles are arranged to the number of from six to ten. The tentacles are hollow and furnished with the stinging organ or nematocysts. It is claimed that from these stinging organs it exudes a poison which benumbs and kills the hydra's prey instantly on being touched, and from the result of experiments undertaken to determine the nature of this poison it has been inferred that the hydra secretes formic acid. This, for the present, must be considered as not fully proven.

The reproduction of hydra is, however, the most interesting feature of this marvelous animal. Of this Dr. Cooke says: "This is in the ordinary way achieved by budding from any part of the body except the tentacles. Sometimes two or three are proceeding at the same time from the same individual. A little tubercle rises on the body of the parent; this enlarges every hour, lengthens, and ultimately tentacles appear at the apex. But no sooner are the young furnished than they commence catching prey on their own account, whilst still attached to the body of their mother."

Dr. Johnson writes as follows: "It is not unusual to behold the young one and the old one struggling for and gorging different ends of the same worm together. In the summer months the young are budded at the rate of twenty in a month, and buds have been seen to develop on the bodies of the young one whilst still attached to their parents. The second mode of reproduction takes place in the winter, in the ordinary way, from eggs. The third is an accidental mode, but the most curious of all. If the body is halved in any direction each half in a short time grows up a perfect hydra; if it is cut into four or eight, or even minced into forty pieces, each continues alive, and developes a new animal which is itself capable of being multiplied in the ordinary manner. If the section is made lengthwise, so as to divide the body into two or more slips, connected merely by the tail, they are speedily resoldered, like some heroes of fairy tale, into one perfect whole; or if the pieces are kept asunder each will become a polyp; and thus we may have two or several polypes, with only one tail between them; but if the sections be made in a contrary direction—from the tail toward the tentacles—you produce a monster with two or more bodies and one head. If the tentacles—the organs by which they take their prey, and on which their existence might seem to depend—are cut away, they are reproduced, and the lopped-off parts remain not long without a new body. If only two or three tentacles are embraced in the section, the result is the same, and a single tentacle will serve for the evolution of a complete creature. When a piece is cut out of the body, the wound speedily heals, and, as if excited by the stimulus of the knife, young polypes sprout from the wound more abundantly and in prefence to unscarred parts; when a polype is introduced by the tail into another's body, the two unite and form one individual; and when a head is lopped off, it may safely be engrafted on the body of any other which may chance to want one. You may slit the animal up and lay it out flat like a membrane, with impunity; it may be turned outside in, so that the stomach surface shall become the epidermis, and yet continue to live and enjoy itself. And the creature even suffers very little by these apparently cruel operations—for, before the lapse of many minutes, the upper half of a cross section will expand its tentacles and catch prey as usual; and the two portions of a longitudional section will after an hour or two take food and retain it."

The natural habitat of the hydra is ponds, ditches and any slow running and stagnant water. Their food is chiefly the smaller species of entomostraca and infusoria among living animals, and probably any small particles of organic matter which may be present. When in confinement they have been known to thrive on shreds of fresh meat. Their presence in any quantity must be taken as indicating a considerable degree of impurity.

ENTOZOA.

Of entozoa we find the common *Auguillula fluviatilis* and it is supposed that the ova of *Ascaris lumbricoidus* have been seen. This worm is the well known parasite of the human intestine, and is the one referred to when mothers say of their children, "They have got worms." It is also a parasite of some of the domestic animals, as for instance the hog, and the probability of its presence may be inferred by considering the nature of the contamination about Hemlock Lake.

ANNULTA.

Of the annulta we have recently identified a few specimens of *Tubiflex rivulorunn*, a reddish transparent worm, whose natural habitat is in the banks of mud deposited from flowing sewage. In the eastern part of the city there are several streams whose flow in dry weather is almost entirely made up of sewage, and in the mud along the margins of these streams tubifex may be found in vast quantity. The more offensive the stenches arising from the deposited sewage the greater the probability of finding tubifex. Several times I have seen the mud margins of these streams completely covered for many hundred feet with this unpleasant representative of the class annulata. Their red color enables one to easily distinguish them, and it an interesting experiment to disturb a colony and observe how quickly they withdraw from observation into the mud.

From a histological point of view tubifex is of the greatest interest, as its transparency is such as admit of a detailed study of the most minute structure of the living worm. "We may learn all the mysteries of its life, see its two hearts, its large liver, its blood vessels, its nervous centers, and indeed its whole nervous and circulatory system." Its presence in any quantity could be safely taken as evidence of sewage contamination.

ROTIFERA.

Of the rotifera twenty species are known to exist in Hemlock lake water and many of them are of interest from every possible point of view. Independent of the sanitary bearing of this study the rotifers are of absorbing interest as objects of natural history alone and it is expected that before our work it finished the number of rotifers will be considerably added to.

They have a wide range of habitat and as to whether their presence in moderate quantities can be considered as indicating anything objectionable mùst be settled by a study of the individual species. *Anuerea longispina* one of the most common species is ordinarily a pure water form. It was originally described by Prof. Kellicott of Buffalo, in 1879, having been found by him in the water of Lake Erie. Its peculiarity is the possession of three long slender spines which perforce of necessity compel it to keep free from entanglement in masses of confervæ and other vegetation. In addition to Lake Erie and Hemlock lake it has been found in Olton Reservoir near Birmingham, England, and in Lake Zug, Switzerland.

Synchaeta, of which we have two species, is usually found among weeds growing rankly from the bottom, and must, in the light of present evidence, be considered a denizen of pure water, or that which is only moderately contaminated.

The type of all the rotifers, *Rotifer vulgaris* is frequently found in quantity and may be safely counted on as searching for food wherever there are masses of decaying algae or other organic matter. It is widely distributed and its presence in Hemlock water in moderate number cannot be taken as indicating serions impurity. It has been frequently seen, however, in waters about the unfitness of which there can be no question.

Hydatina senta, of which a few individuals have been seen, is only at home in water reeking with the products of decomposition. Indeed, of all habitations it rejoices most in the drainings from a manure heap, and according to Hudson and Gosse it can be found in such even when the water is of so deep a color that it is impossible to see the animals in it when you have got them. *Brachioni* also prefer water equally contaminated, and *Brachionus angularis* thrives in water so impure that hardly any rotifer but itself can exist therein. We have, however, as yet identified but one brachionus in Hemlock lake water, namely, *Brachionus conium*, *Atwood.*

Concluding the subject of the rotifera, the observation may be made that they are genetically related to the tubifex and, that, while some species are only found in pure waters, the most of them undoubtedly thrive best in waters containing organic matter in a state of decomposition. The presence of large numbers of rotifers must, therefore, be regarded with suspicion, though as above noted, a decision for any particular species will depend upon a thorough study of the particular form in its native habitat.

FRESH WATER POLYZOA.

Plumatella, *Paludicella* and *Christatella* are the three representatives of the fresh water polyzoa thus far identified. Our President has made a special study of these animals, and has watched the development of plumatella from a few individuals to a numerous branching colony, consisting of hundreds. During the winter months the statobasts are found in nearly every filtering. These were formerly supposed to be an egg, but they are now known to be rather a reproductive bud. They can be easily isolated, and if kept in water away from direct light will at length open and permit the escape of the young polyzoon.

The fresh water polyzoa are generally found either in slow running water or in that which is entirely without motion. With the single exception of Christatella they thrive best in darkness, rather than in light. They are, also, with the exception of the same genus, immovably fixed to one location for life. Christatella, however, has some power of locomotion and moves about from place to place. If one desires to collect them they can be looked for usually near the surface of the water, either attached to the under-side of falling leaves or to stones or planks. Generally they may be looked for in waters containing decaying matter, and Johnson says of one species, not, however, found in Hemlock lake, that it occurs in stagnant waters, especially such as are tinctured with iron in solution. Their presence in Hemlock lake water must also be taken as indicating at any rate a moderate degree of contamination.*

ENTOMOSTRACA.

Fourteen species of entomostraca have been recognized, and several of them are found at different seasons in great quantity. A knowledge of these little animals is of the greatest importance, not only because of their unparelled numbers, but because of their intimate relation to what may be termed *gross* organic infection.

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*See Observations on Polyzoa, by Alpheus Hyatt.

They serve not only as food for many species of fish, but they also serve (being themselves enormous gluttons) as devourers of that which if left in the waters they inhabit would become the source of devastation and death. Referring to this group, C. L. Herrick, the American authority, says: "The animals of the above group are, it is likely, the best criteria by which to judge of the purity of natural waters, if their distribution were correctly understood. A critical study of the contents of samples of such waters will enable us to determine their character almost as well as by analysis."

Mr. Herrick gives the following list of entomostraca and other animals, and number of individuals of each species visible in a quart of filthy pond water taken at a single dipping, as suggestive on this point:

Daphnia pulex	6
Ceriodaphnia	1,400
Simocephalus	56
Cypris	50
Cyclops	30
Sand Fleas	120
Infusoria	35
Mollusca	35
Miscellaneous	35
Total	1,767

"The above are all visible to the (trained) unassisted eye; the truly microscopic forms number vastly more."

Cyclops, represented by the species *Cyclops tenuicornis* is of interest because of its amazing fecundity, a single female becoming the progenitor in one season of a progeny of 4,442,000,000, as computed by Jurine.* The mature female lays three times a month and each time from thirty to forty eggs. Among the young the females greatly predominate, and they arrive at maturity and begin laying eggs in thirty days, so that as Jurine very conclusively shows, the above number of over 4,000,000,000 is a reasonable increase.

Sida crystallina is considered to be a rare species and is referred to by Herrick as being "quite rarely seen." Baird also says of

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*Baird says; "Jurine has with great fidelity watched the hatching and increase of the *Cyclops quadricornis* (tenuicornis) in particular, and has given a calculation which shows the amazing fertility of the species. He has seen one female isolated lay ten times successively, but in order to speak within bounds, he supposes her to lay eight times within three months, and each time only forty eggs. At the end of one year this female would have been the progenitor of 4,442,189, 120 young!! The first mother lays forty eggs, which at the end of three months, at eight layings during that time, would give three hundred and twenty young. Out of this number he calculates eighty as males (there being in every laying a great proportion of females), the remaining two hundred and forty are females." Jurine gives an estimate in detail justifying the above figures.

this species : "They do not appear to be numerous in the localities in which I have found them, and indeed are of rare occurence." If either of these eminent naturalists had had the opportunity of fishing for sida in Hemlock lake during the months of July and August, they would, I am sure, have very materially modified this opinion.

Diaptomus pallidus is of special interest from the fact that is known to be the host of a new ectoparasitic protozoan *Pedicularis.**

It has been suggested that the scavenging tendencies of the entomostraca be taken advantage of to assist the purification of sewage contaminated waters, such assistance to be derived from the breeding of these animals and others which are natural scavengers in water requiring purification A study of this question by Dr. Sorby has led to many facts of interest and value and we may refer to some of the more interesting here. He finds that the number per gallon and the percentage relationships mark changed conditions in the water, the discharge of a certain amount of sewage being indicated by an increase in the total number per gallon, or by an alteration in the relative numbers of the different kinds, or by both. "There is found, however, a very decided limit to the increase of entomostraca when the water of a river is rendered too impure by the discharge of too much sewage, probably because oxygen is deficient, and free sulphide of hydrogen present."

Dr. Sorby found that cyclops could be kept alive for many months when provided with no other food than human excrement, and he is led to the conclusion that when the amount of sewage discharged into a river is not too great it furnishes food for a vast amount of animals, which perform a most important part in removing it.

Dr. Sorby has collected many other facts of interest relating to this subject, and concludes his paper substantially as follows : "Taking all the facts into consideration, it appears that the removal of impurities is more a biological than a chemical question ; and that in all discussions of the subject it is most important to consider the action of minute animals and plants, which may be looked upon as being indirectly most powerful chemical reagents." †

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*A Final Report on the Crustacea of Minnesota, by C. L. Herrick.

†Paper on the Detection of Sewage Contamination, by the Use of the Microscope, and on the Purifying Actions of Minute Animals and Plants, by Dr. H. C. Sorby in the Journal Society of Arts, XXXII (1884), pp. 929–39 ; also in Journal Royal Microscopical Society., Part II (1884), pp. 988–91.

BACTERIA.

The entomostraca substantially conclude our list of animal life residing in Hemlock lake, and we may now turn to the protophyta; and among these, as being lowest in the scale, we will first consider the bacteria. Several species have been seen, but whether they belong to the septic or pathogenic forms we have no means of determining. At any rate, the conditions about Hemlock lake are such as to render the presence of pathogenic bacteria at times by no means improbable.

The stimulating effect of the dissolved phosphates and nitrates of commercial fertilizers has vast importance in relation to the possibility of the presence in Hemlock water of the pathogenic bacteria. These substances are found to be the natural nutrients for bacterial life, and their presence even in very minute quantity would be liable to lead to serious consequences.

A recent editorial in the *Sanitary Engineer* places the argument so appositely in its application to the conditions at Hemlock lake that I will cite the conclusions here. The editor says: "A dangerous water supply is not merely one which actually contains specific pathogenic bacteria. It is one which is specially liable at times—not always—to contain bacteria. This liability exists whenever a water supply is contaminated with human excreta, and biological analysis, in the great majority of cases, is simply one means of determining whether such contamination exists."

As yet the Microscopical Section has not undertaken to make the modern culture determination of the number of bacteria present per unit of volume of water. The Section, however, has at least two members qualified to conduct such examinations, and it is expected that during the present year a series of such cultures will be made, the results of which will in due course be laid before you.

FRESH WATER ALGÆ.

Of the fresh water algæ, including the desmids and diatoms 73 forms are known to exist, and of these 10 classify with the desmids and 39 with the diatoms, leaving 24 which belong with the filamentous and such unicellular forms as are not included with the diatoms and desmids.

The desmids may be dismissed with a few words. So far as known they have no special significance, being found in water of nearly all degrees of purity. They have never yet been seen in Hemlock water in quantity.

The diatoms are represented by a large number of species and many of the species by many individuals. At times a brownish scum is found around the margin of the lake, consisting of innumerable quantities of these little plants. They are not known to be in any degree prejudicial to health, though without doubt they are occasionally the cause of certain bad smells found in various waters.

Of the fresh water algæ, the most of them are of the grass green varieties, and, generally speaking, cannot be considered as possessing any specially deleterious properties. A few species, however, may be noted as an exception to this rule, as for instance, *Conferva bombycina*, is frequently met with as a yellowish, green, cloudy stratum in stagnant water. This algæ has narrow thread-like filaments with the cells from four to five times as long as broad.

Nastoc piscinale, *Sphaerozyga polysperma*, and three species of *Oscillaria*, which have been identified, are of special interest by reason, not only of their possible relation to the bacteria, but because of their having been concerned in serious troubles which various water supplies have experienced at different times. These plants are farther closely related to the anabænas, which are specially liable to give rise to unpleasant odors and tastes when undergoing decay.

The nostocs are farther of interest in this connection as being the chief source of the unpleasant smell known as the pig-pen odor.

It is a matter of congratulation, therefore, that thus far these species have been seen in Hemlock water, with one exception, in very small quantity. The single exception is an *oscillarian*, present about a year ago in considerable quantity, but which was not at that time, so far as known, the cause of any unsanitary condition of the water.

This matter of the relation of plant forms to unsanitary conditions is not only of the greatest interest from the sanitary point of view, but it farther has important bearings to the student of cryptogamic botany and certain questions as to mode and period of recurrence may possibly be settled by such a long-continued series of systematic observations as this Section has undertaken to make.

PROVISIONAL CONCLUSIONS.

The above is a fair exhibit of the microscopic fauna of Hemlock lake so far as it has been elucidated up to the present time. By the end of another year we hope to be able to lay before you many facts of interest, of which at the present time the significance has not been made out. Moveover, the conclusions of this paper, so far as we may express any, must be considered as somewhat provisional and subject to revision if additional study shall seem to justify the same. Relative to the inferences made as to the sanitary significance of the various classes of animals and plants, I may say that the provisional conclusions are intended to be based upon known characteristics, either as determined by the various authorities who have studied these forms and recorded the results of their observations, or as determined by members of this Section.

COMPARATIVE CHEMICAL ANALYSES.

It is to be regretted that we have not a series of chemical analyses at hand taken during the time covered by these biological studies. As shown at the beginning of the paper the two were in accord in 1877, and also in 1881, one proving the correctness of the other, and it cannot be doubted but that a corresponding accordance would be found at the present time. In the absence, however, of such chemical evidence your attention may still be again directed to the general truth that the biological analysis properly made, will, so far as organic contamination is concerned, show everything that can be shown by chemical analysis, with the material advantage of making the showing in detail, whereas the chemical examination could only show the *gross* contamination without the power of discriminating as to whether it arose from the presence of the protozoa or the protophyta.

Some chemists have indeed claimed that this fact could in a general way be determined by observing the relations existing between the organic carbon and the organic nitrogen, the supposition being that organic carbon would be in excess when the contamination was largely vegetable in its character and that organic nitrogen would be the chief constituent of animal contamination and that the relative amounts of these two forms of organic contamination would be expressed by the ratio of one to the other. Following this view series of analyses have been made tabulating separately these two kinds of organic contamination. Prof. Nichols has, however, shown that little value can be attached to evidence of this kind.* Especially is this true in those cases where the organic contamination is largely made up of the algæ which have their structure composed of a jelly-like protoplasm. All such are in chemical constitution probably nearly identical with the corresponding low forms of the protozoa, and the bulk of their substance is organic nitrogen and not organic carbon.

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*On the Examination of Mystic Water with Remarks on Frankland's Method of Water Analysis, by Wm. Ripley Nichols, Professor at the Massachusetts Institute of Technology, in he Supplement to the Report of the Massachusetts State Board of Health for 1879.

Chemical analysis would however, be of value to us in indicating whether or not any change had taken place in the mineral constituents. It might also indicate if carried on for any length of time in conjunction with the microscopic study whether or not there was any relation between the living forms and the presence of the nitrates.

In concluding the subject it may be stated that in thus presenting to the notice of the Academy the present sanitary condition of the water of Hemlock lake, there is no intention of alarming either the members of the Academy or the public. Indeed we do not consider the contamination as yet serious enough to be the cause of any alarm. We do think, however, that the gradually increasing contamination which has been shown to exist is a matter worthy of consideration by every citizen of the city of Rochester. Certainly the building of a railway to Hemlock lake and the making of a public pleasure resort would be in the fullest sense a public calamity, and it cannot be possible that the eminent citizens who have advocated such a road really understood the tendencies of their project. Rochester already has abundant pleasure resorts at Lake Ontario with every facility for unlimited extension in that direction, and in the interests of sound public health, it is to be hoped that if additional pleasure roads are required they will be built in the direction of Ontario rather than Hemlock.

IMMEDIATE ROOT-FILLING.

Immediate root-filling is admissible in cases where there is little septic infection or inflammation beyond the apex of the tooth, in most cases of abscess with a fistulous opening, and in the majority of those in which disinfection is positively complete. But when there is probably considerable infiltration or deposition of inflammatory products, or when there is a chronic irritation as manifested by a persistent pericementitis of a sub-acute character, the use of the proper remedies introduced through the pulp-canal should be continued until resolution is either begun or completed.—Editoral, *Independent Practitioner.*

A COURSE IN ANIMAL HISTOLOGY.

BY THOMAS G. LEE, M. D.,
Lecture in Normal Histology, Medical Department Yale University.

PART III.

BLOOD.—*Continued.*

177. **Fat Tissue.**—In the fully-developed condition fat tissue is seen to be composed of minute vesicles, which are held together by delicate fibers of connective tissue, and numerous capillary blood vessels. A single vesicle consists of a thin membrane enclosing a droplet of fat, and a flattened nucleus is to be found usually at one end of the cell. Fat cells are originally connective tissue cells in which the protoplasm becomes infiltrated with minute particles of fat. These become joined into a large globule, which displaces the remaining protoplasm and the nucleus. Eventually, the protoplasm is all replaced by fat. These changes may occur in isolated cells, or a number of connective tissue cells may multiply and become changed into fat.

178. **Mucoid or Gelatinous Connective Tissue.**—This is found in the embryo, and consists of branch and spindle-shaped cells, with well-marked neuclei, which form a loose interlacing network. The interspaces are filled with a transparent mucoid substance. Adenoid tissue, which is the supporting structure of lymphatic tisssue, and the neuroglia are modified forms of fibrous connective tissue.

CARTILAGE.

(*a*) Hyaline Cartilage.—Open the joint of a recently killed animal, and cut thin sections of the free surface, and examine in a $\frac{3}{4}$ per cent. salt solution or iodized serum. Note the transparent matrix and the large cells which fill the lacunæ. Treat a similar section with iodine and examine the matrix stained yellow and cells brown.

Kill a small animal, a frog, place articular end of a long bone in 1 per cent. gold solution thirty minutes; wash and expose to light in water slightly acidulated with acetic acid until cartilage is violet color; cut and mount section in glycerine,—cells deeply stained, matrix slightly so. Treat another of the long bones with $\frac{1}{2}$ per cent. solution silver nitrate; expose to light till brown; cut; mount in glycerine,—matrix brown; cells unstained. To fix the cartilage cells a saturated solution of picric acid is best. Remove the acid from the cartilage by washing in dilute alcohol; cut sections and stain with hæmatoxylon carmine or purpurin; last stains the cells only. Ranvier's formula is 200 gm. water and 1 gm. alum boiled in porcelain capsule; purpurin added to saturation; filtered while hot; alcohol 60 c. c. added,—stain twenty-four hours; mount in glycerine.

(*b*) White Fibro Cartilage.—Make transverse sections of the fresh intervertebral disk of an animal; stain with hæmatoxylon or carmine; mount in glycerine; note the branching fibers of matrix and the cells with well marked capsules.

(*c*) Yellow Elastic Cartilage.—Make transverse section of the epiglottis of an animal, as pig; stain with picro-carmine. Note the cells and the matrix containing yellow elastic fibers.

(*d*) Junction of Cartilage and Bone.—Decalcify the extremity of a long bone, and cut longitudional sections through the junction of the cartilage with the bone; stain in hæmatoxylon or picro-carmine and note the change in the cartilage as it approaches the bone.

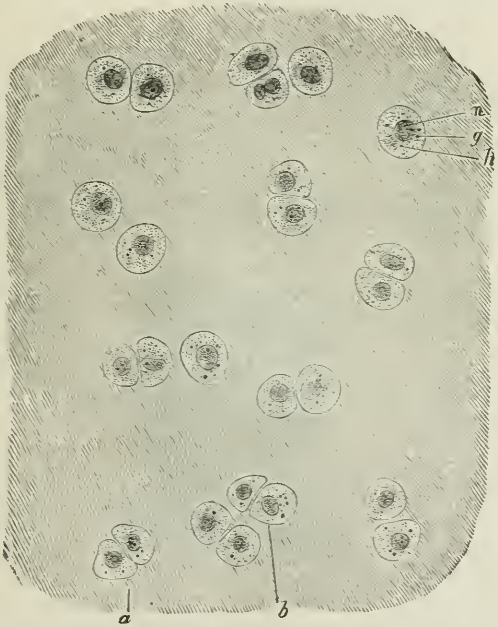

Fig. 9. Hyaline Cartilage. Metatarsus, Man. *a*. Group of two cells; *b*. four; *h*. protoplasm; *g*. fatty granules; *n*. nucleus.

179. Cartilage.—This is a much more dense form of connective tissue, consisting of a matrix or ground substance, and large, well-marked nucleated cells. There are three varieties of cartilage, True, or Hyaline, White Fibro, and Yellow Elastic. Cartilage, with the exception of articulating surfaces, is everywhere covered by a firm, fibrous connective tissue membrane, the perichondrium, this contains the blood vessels, nerves and lymphatics.

180. **Hyaline Cartilage,** which is the principal form of cartilage, consists of a transparent, homogeneous matrix and cells, which are round or oval, and contain one or two nuclei. These are enclosed in cavities, or lacunæ, in the matrix. These cells multiply by indirect division, and from two to four may be seen in a lacuna. Each cell is surrounded by a capsule, and with the division of them the new cells become enclosed in a new capsule, and the matrix is formed from these cells, and by its increase the cells become more and more widely separated. There are minute juice channels between the various lacunæ by which means fluids may pass through the substance of the cartilage. The cells may become filled with fatty granules, and in old people the matrix often becomes impregnated with lime salts. Hyaline cartilage is found at the extremities of bones, costal cartilage, trachea, etc., and is the form of cartilage in which the bones are developed.

181. **Fibro Cartilage.**—In this form the matrix is composed of bundles of connective tissue fibers, arranged in layers. These often have a direction at right angles to each other. Between are found large nucleated cells enclosed in capsules, and frequently in long rows. This variety of cartilage is seen in the interarticular cartilage and the intervertebral disks, etc.

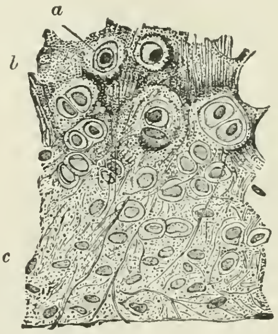

Fig. 10. Yellow Elastic Cartilage, Epiglottis. *a.* Cartilage cells; *b.* granular matrix; *c.* clearer matrix.

182. **Yellow Elastic Cartilage** is found in the cartilages of the ear, epiglottis, and some of the smaller laryngeal cartilages. The cells are similar to those of the other forms, while the surrounding matrix is permeated with branching yellow elastic fibers. The matrix is originally hyaline, but becomes filled with elastic fibers, so that in an adult specimen little or no hyaline substance is seen.

BONE.

(*a*) Dry Sections.—A bit of the shaft of a bone is cut into as thin sections as possible with a saw, and one surface is ground smooth on an emery wheel in a lathe, or on a piece of glass, with moistened emery. When one side is perfectly even and smooth, it is cleansed, dried and cemented, with thick Canada balsam, to a piece of glass. The other side is now ground down till it is very thin and transparent. The bone is cleansed of bits of sand, etc., and then it is put in turpentine to dissolve the balsam. When free, it is dried and and mounted with very thick balsam on a slide. The thick balsam does not readily fill the lacunæ and spaces in the bone, and thus they remain filled with air, which causes them to appear very distinct under the microscope. The preparation is somewhat tedious, but the result will repay the time spent.

(*b*) Decalcified Bone.—A portion of the shaft and the extremity of a long bone from a recently killed animal is decalcified (33—40), and transverse and longitudional sections are made. Some of these should be stained with hæmatoxylon or methyl violet, and others which are mentioned, unstained in a solution of potassium acetate. Note the difference in appearance from (*a*), the lacunæ and Haversian canals appear, but not the canaliculi ; note also the bone corpuscles.

(*c*) Development of Bone.—Bone from a newly born or fœtal animal are decalcified and sections made in various directions ; stained with hæmatoxylyon or carmine, or double stains, as hæmatoxylon and eosin; picro-carmine and analin green give good results. Note the arrangement of the cartilage cells, the medullary spaces, the calcified cartilage, the new bone, the blood vessels, osteoblasts and osteoclasts.

(*d*) Intra-membranous Development.—Cut transverse section of a flat bone, as a skull bone from a fœtal animal ; stain with picro-carmine.

(*e*) Marrow—Red marrow may be obtained in spongy bone, yellow in the shafts ; may be examined fresh in a $\frac{3}{4}$ per cent. salt solution, or iodized serum, or hardened in alcohol, and stained with hæmatoxylon; mount in glycerine. Note the giant cells or osteoclasts, the osteoblasts and bloodvessels.

183. **Bone.**—This is the most dense of all the connective tissue-group of structures, and is composed of the matrix and bone corpuscles. Bones are covered with a membrane called the periosteum. This is, however, absent at the articular surfaces This membrane consists of two layers, an outer one of dense fibrous

tissue, and an inner one of looser consistency called the osteogenetic layer. This contains networks of small bloodvessels, and numerous round or oval cells which enter into the formation of bone, and are known as osteoblasts. In the center of the shafts of long bones, and in the spongy substance of bone, is found the bone marrow, consisting of cells of various sizes, many of them multinucleated, and capillary bloodvessels. These are held together by a few connective tissue-fibres. The marrow cells are identical with those of the osteogenetic layer of the periosteum. In the shafts of bone the marrow contains much fat, and is called yellow marrow; that of the ends of bone is red in color, and is one of the places of origin of the red blood corpuscles. The multinucleated large cells of the marrow have to do with the absorption of calcified cartilage and are called osteoclasts.

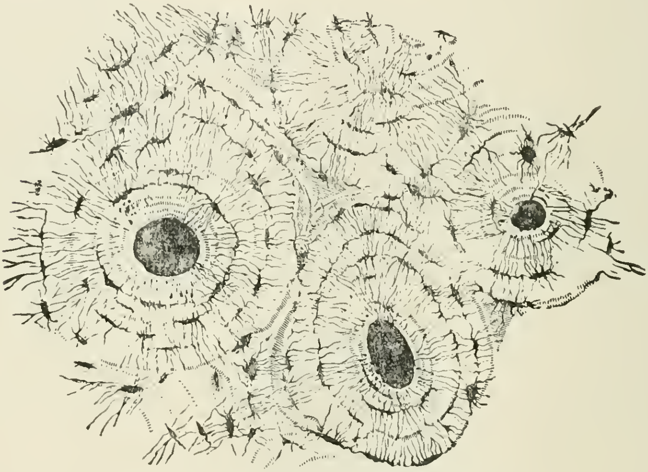

Fig. 11. Compact Bone, Transverse Section, Man.

184. **Bone Matrix** consists of very dense fibrous tissue containing phosphate and carbonate of lime. Between the fibres the organic substance is rendered distinct by decalcifying. Bone consists of compact and spongy portions. The spongy bone is that found in the heads of long bones and in interlacing trabeculæ of bone substance. The spaces contain red marrow.

Compact bone is found in the shafts of long bones, and as the outer layer of short and flat bones it is arranged in layers or lamellæ, which are of three varieties, the Haversian, circumferential and the interstitial lamellæ. The principal lamellæ, the Haversian, are arranged in more or less concentric rings around a central hole, the Haversian canal. Each of these sets of rings, and central canal, form an Haversian system. Between the lamellæ are found numerous minute oval cavities, the lacunæ. These communicate with each other in all directions by means of delicate tubules, or canaliculi. Thus is formed a free lymph communication throughout the whole bone substance. In each lacuna is found a bone corpuscle, or cell. This is a branched oval, nucleated cell. The branches extend into the canaliculi, while the cell itself does not completely fill the lacuna. The Haversian canal contains a bloodvessel, nerve and lymphatic, and a small amount of marrow. These canals branch and anastomose with one another, as can be seen in a longitudial section of bone. The Haversian systems are the interstitial lamellæ. These run in various directions, while underneath the periosteum are lamellæ arranged about the outside of the bone. These are the circumferential lamellæ.

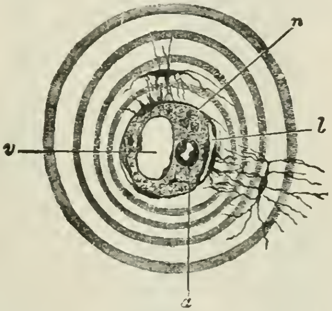

Fig. 12. Diagram of Haversian System and Canal. *a.* Arterial capillary vessel; *v.* venous capillary; *n.* nerve fibers; *l.* lymphatic vessel.

185. **Development of Bone.**—Bone is developed in two ways: from hyaline cartilage, or the endochondral formation, and from membrane, or the intramembranous formation. The endochondral is the method of formation of all bones, except the flat bones, etc., which are intramembranous.

186. **Endochondral Bone Formation** begins at certain points or centers in the hyaline cartilage. From this center channels extend in various directions containing portions of the osteogenetic layer of the periosteum. The cartilage cells assume the form of rows, those nearest the center becoming greatly enlarged and transparent. The matrix below these rows becomes impregnated with lime salts. By the absorption of the walls of the lacunæ, there are formed irregular cavities, which are surrounded by these calcified trabeculæ of cartilage. These contain numbers of osteoblasts, which

line the walls of the trabeculæ, and gradually deposit new bone tissue upon the calcified cartilage, which in time becomes absorbed. The original cartilage in this manner is changed into a mass of spongy bone containing large marrow cavities. In a longitudinal section of fœtal bone all these changes can be seen at the same time, from the advanced changes near the center shading off into hyaline cartilage at the outer portion. These same changes take place in the epiphysis, and as long as the bone continues to form in length there is cartilage between the shaft and these epiphyses. This finally undergoes the same changes, and the bone is completed in length. Similar changes are taking place in the periosteum. In the osteogenetic layer cavities are formed which become Haversian spaces filled with marrow.

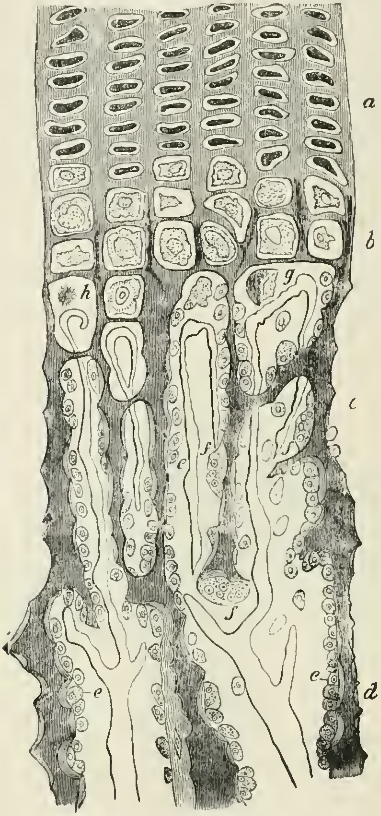

Fig. 13. Developing Bone, Longitudinal Section, Rabbit. *a.* Flattened cartilage cells; *b.* greatly enlarged; *c.*, *d.* formed bone, with osteoblasts (*e*); *f.* osteoclasts; *g.*, *h.* shrunken cartilage cells.

The spongy bone in the body of the shaft becomes absorbed through the agency of the osteoclast, and disappears, forming what is the future marrow cavity of the shaft ; that of the ends of the bone remains as a permanent structure. In the Haversian spaces of the periosteum layers of bone are formed by the osteoblasts which line them, and thus the lamellæ of the Haversian systems are produced, the cavity remaining becoming the Haversian canal, and the osteoblasts, which are enclosed between the lamellæ, forming the bone corpuscles. In this manner the original cartilage becomes transformed into bone. The increase in thickness of the bone is due altogether to periosteal formation.

Intramembranous Bone Formation.—The facial bones, and the flat bones of the skull, are formed from the periosteum alone by the formation of Haversian spaces, which are filled with osteoclasts, bloodvessels and osteoblasts. These form lamellæ of true bone substance.

MUSCLE.

(*a*) Nonstriated Muscle.—Distend a piece of the small intestine of an animal, as cat, with absolute alcohol, or 80 per cent. alcohol containing picric acid ; place in dish of the same fluid, for 2 to 3 days, when shreds of muscle fibres may be torn away. If hardened in alcohol, stain in hæmatoxylon ; if picric acid, the fibers will be yellow. Tease well ; mount in glycerine ; note long nuclei and longitudinal striation.

(*b*) Striated Muscle.—Place a bit of fresh muscle in distilled water and note the sarcolemma ; treat a piece of muscle with dilute chromic acid, $\frac{1}{6}$ per cent., for a week ; tease ; it tends to split longitudinally into fibrillæ. Stain another piece with carmine, 2 per cent., for a week ; it now tends to split transversely in disks. The muscles of a crab or water beetle are fine subjects for the study of this tissue. Harden a piece of muscle, as tongue, in alcohol ; cut sections ; stain with hæmatoxylon or carmine ; mount in balsam ; note the striation of fibers, nuclei, endonysium and perimysium. Stain and trace a bit of fœtal muscle ; note the great number of nuclei and the commencing striation.

(*c*) Heart Muscle.—Cut sections transversely and parallel with the heart fibers ; stain, and note the branching fiber, nuclei, striation. (See Heart.)

PRECEPTOR AND PUPIL CONTRACTS—FORMS.

BY MESSRS. JEROME & NASON, ATTORNEYS AND COUNSELLORS AT LAW, NEW YORK.

[Reported to the Dental Society of the State of New York.]

AGREEMENT, Made in the.........of...... ...., County of................, in the State of New York, this.............. day of....... .... 188.., between........................ of the........of................County of............. .., in the State of New York, party of the first part, and.... ....of the...............of................ County of..................in the State of...................., party of the second part.

WITNESSETH, That whereas the said party of the first part by profession a dentist, and duly qualified as such under the law of the State of New York to practice his said profession of dentistry within said State is desirous of associating with himself as a..................the said party of the second part, to the end that he may teach, instruct, and perfect the said party of the second part in the practice and art of said profession of dentistry, and that the said party of the second part may assist and co-operate with him in the practice of his said art or profession ; and whereas the said party of the second part is desirous of associating himself with the said party of the first part ; and whereas the said party of the first part now has a large and extended practice in his art or profession of dentistry, and many patients who resort to him for treatment in his said art or profession from the region in and about the...........of.................extending to a distance of many miles in all directions therefrom, to wit : to the distance in all directions of about............miles ; and both the parties hereto are desirous that on the dissolution of the relationship created between the parties hereto by this agreement, there should be no conflict of interests between the said parties in the practice of their profession or art of dentistry. Now, this Agreement witnesseth, that in consideration of the mutual promises hereinafter set forth and of the sum of one dollar by the party of the first part to the party of the second part this day in hand paid, the receipt whereof is hereby acknowledged, it is mutually promised, covenanted, and agreed by and between the parties hereto.

I. That on the terms and conditions in a memorandum hereto annexed expressed, the party of the first part will well and properly, in the manner and according to the customs and usages in that respect now practiced in the art or profession of dentistry, teach, instruct, and perfect the party of the second part in the art, practice and profession of dentistry for and during the period of.......... ....from the date first above written.

II. That, on the terms and conditions in a memorandum hereto annexed expressed, the party of the second part will well and faithfully, for and during the period of.......... ....from the date first above written, the said party of the first part assist in, and learn from him, the said art, practice and profession of dentistry, in the manner and according to the customs and usages in that respect now practiced in the art or profession of dentistry; and the said party of the second part hereby expressly promises and agrees, that during the continuance of, or upon the dissolution in any way, of the relationship between the parties hereto by this agreement created, he will not practice or follow the art or profession of dentistry in the............of....... ....in the State of New York, or within the distance of..............miles from said ....of...................., while the said party of the first part shall practice or follow the said art or profession of dentistry in the said............of...................., or within ....miles thereof; saving and excepting such time as he, the said party of the second part, may so practice or follow the art or profession of dentistry by the written consent of, and as assistant to, or pupil of, the said party of the first part.

III. That the terms and conditions in the memorandum hereto annexed, expressed, shall be taken as a part of this agreement the same as if they had herein been set forth in full.

In Witness Whereof we have hereunto set our hands and affixed our seals the day and place first above written.

............................[L. S.]
............................[L. S.]

STATE OF NEW YORK, }
County of.................... } ss.

On the..........day of...................., 188.., before me personally came.. to me personally known and kown to me to be the persons mentioned and described in the foregoing instrument and who executed the same, and they thereupon severally acknowledged to me that they had executed the same for the intents and purposes therein expressed.

Memorandum mentioned and referred to in the foregoing instrument.

The terms and conditions of the agreement in the foregoing instrument other than those therein expressed are : . . . .

. . . .

. . . .

. . . .

. . . .

. . . .

FORM FOR MINORS.

WHEREAS, at. . . . . . . .request. . . . . .dentist of the. . . . . .of. . . . ., County of. . . . ., in the State of New York, as party of the first part, on the. . . . . day of. . . . ., 188. ., entered into a certain agreement in writing with one. . . . . .of the. . . . . .of . . . ., County of. . . . . in the State of. . . . . , an infant, as party of the second part, whereby among other things the said party of the first part, subject to the terms and conditions in said agreement, agreed to teach, instruct, and perfect, during the period of. . . . . from the date of said agreement, in the art, practice and profession of dentistry, the said party of the second part, and the said party of the second part thereby, among other things, for a like period, and subject to the same terms and conditions, agreed to well and faithfully, the said party of the first part, assist in, and learn from him, the said art, practice and profession of dentistry, and promised and agreed that he, the said party of the second part, would not, during the continuance of or upon the dissolution, in any manner, of the relationship created between the parties thereto by said agreement, practice or follow the art or profession of dentistry in the. . . . . of. . . . ., in the State of New York, or within the distance of. . . . . .miles from said. . . . . .of . . . . .while the said party of the first part should practice or follow the profession of dentistry in the said . . . . .of. . . . . .or within. . . . . .miles thereof, saving and excepting such time as he, the said party of the second part should so practice or follow the art or profession of dentistry by the written consent of, and as the assistant to or pupil of the said party of the first part. Now therefore,

KNOW ALL MEN BY THESE PRESENTS, That in consideration of the said. . . . . .having at. . . . . . .request

entered into the agreement above set forth, and in consideration of one dollar to .....in hand by the said......................... paid on the ensealing and delivery of these presents, the receipt of which is hereby acknowledged,........ ....
....
held and firmly bound unto..............................of the ... .of...................., in the State of New York, in the sum of...... ....dollars, lawful money of the United States of America, to be paid as liquidated damages and not as a penalty, to the said........................, his executors, administrators, or assigns, for which payment well and truly to be made........bind .... heirs, executors, and administrators, firmly by these presents.

Sealed with.... .... seal....and dated the.... ....
day of........ ...188 .

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if.....
...., an infant, hereinabove mentioned and described, shall well and truly perform, according to the true intent and meaning thereof, all the agreements and promises by him, in the said agreement hereinbefore mentioned and described, agreed and promised to be performed, then the above obligation to be void, otherwise to remain in full force and virtue.

Signed, sealed and delivered in presence of

............................[L. S.]
....[L. S.]

STATE OF NEW YORK, } ss.
COUNTY OF.................. }

On the ....day of...................., 188.., before me personally came........................ ....
to me personally known and known to me to be the person mentioned and described in the foregoing instrument, and who executed the same, and........thereupon.... ....acknowledged to me that............had executed the same for the intents and purposes therein expressed.

THE WORTH OF A GOOD DENTAL COURSE.

BY W. F. A., ROCHESTER, N. Y.

[From a paper read before the Rochester Dental Club.]

It teaches the principles and theories by which we do our work.

It gives actual practice and operative demonstration.

It teaches Pathology, Therapeutics and Surgery in the most convincing and lasting manner by allowing the student to perform operations under the eye of trained and competent teachers.

It gives a student a chance to see all kinds of work, and judge of its comparative merits.

It gives the student a chance to see all kinds of instruments used and how they are used.

It gives the student a chance to measure himself with other men, and learn his own worth and caliber.

It takes the conceit out of a fellow, and teaches many practical lessons in morals and manners, as well as many lessons in immorals and cussedness, and I am sorry to say he is as liable to learn and practice the latter as the former.

A college course in dentistry gives a man a standing, properly introduces him into his profession as a legitimate practitioner. Gives him self respect, and makes him an honorable member of the profession if there is any honor in him, and, if he is an honorable fellow, makes the profession just so much more powerful and useful in its great work to bless and benefit the race.

A college course, if the student has done his work honestly and well, passed his examination on his own merits and worth, makes him feel he has accomplished something worthy in life, and he can justly claim a part of the world's favors and emoluments.

He has made a place in the history of the institution. and among his contemporaries, and it is known and published to the world what he is. He is no longer unknown, but is known by some of the best of the profession. There is no college so poor that don't possess one or two good men whom the profession esteems.

The college course has brought all his faculties to a focus, has shown him where he is weak, and what he needs to know, has taught perseverance and steady work, has given him the experience of many years of hard work and accumulated knowledge, has pointed out the stumbling blocks in the way of young practitioners, and has made him familiar with the voices and thoughts of the best and most learned in the profession, and given him the right, after his graduation to practice the same on an equal standing and footing with them, with all the rights and privliges they enjoy.

The personal contact with the men in his class, the personal surroundings of the school, the class rows and victories, as well as the failures and mortifications, and shadows that hang over every class and mellow the sunshine, the warm and lasting friendships that are made, the love for the dear old *Alma Mater*, make a picture in life', history that is so pleasant to look back upon from the distance, that few of us would be willing to exchange it or wish that it had not been.

The closing and parting words of the honored professors, when they meet us for the last time, and give us their parting admonition and blessing, and then sever the ties which have bound us, with closing and fitting words, that bring tears to the eyes of many stout and brave hearts, make a man feel that it is worth something to have the beginning of a career introduced by those so noble and brave, and have the course ended by so kind, tender and true a friend as was Prof. James Truman.

FAILURES IN ARTIFICIAL DENTURES.

The *chief* cause of failures is largely overlooked, viz.: faulty articulation, and which can often be remedied by a few minutes' grinding, but more often a re-arrangement of the teeth is necessary.

If the plate comes in close contact with the membrane, excepting over the hard palate, where it should always be raised slightly to prevent future rocking and irritation, there will be sufficient adhesion. The vacuum cavity is non-essential, and in hard mouths often defeats its object by allowing the plate to bear on the hard palate, anterior and posterior to the margin of the vacuum cavity.

In the arrangement of the upper teeth, attention must be given to the anterior teeth first, placing them in such position that the lower will never meet them, otherwise there will be trouble by tipping from behind. To be sure, patients sometimes get used to the displacement of the plate from this cause, learning to control it, involuntarily with the tongue, but I have observed they are always glad to find relief, which can often be secured by grinding either the upper or lower teeth.

Another difficulty often arises from an unbalanced plate, the teeth being longer on one side than the other, or rather meeting quicker. This sometimes occurs from the fact that all the lower teeth on one side are missing, while on the opposite side are one or two bicuspids. This trouble can be relieved only by the extraction of these one or two bicuspids and the insertion of a partial plate, so as to throw the pressure equally on both sides; any *sentiment* as to the extraction of sound teeth to the contrary notwithstanding. It is simply a question of comfort and usefulness of the inevitable denture which must be worn.

Another point to be guarded against is a lower third molar; sometimes a second molar, on one or both sides, which, from the loss of anterior molars, have pitched forward to an angle of forty-five degrees. An upper artificial tooth meeting this *surface* results in crowding the plate forward, consequently they should never meet, unless the tooth can be set directly on top, or to the rear where it would form a *catch.*

When the surfaces of the lower bicuspids, if they are the only posterior teeth remaining, form an inclined plane, they should be ground, or filled, or capped, so as to present a flat surface.

In lower sets, care should be taken to prevent undue pressure at the ends of the plate. This is a very common fault; the result of which is serious irrition of the membrane, as well as displacement of the plate. I have noticed that the dentist often fails to realize how to properly remedy it. He keeps filing away the plate instead of grinding the teeth.

Another cause of trouble with lower sets arises from making the plate too deep, either on the inner or outer margins, sometimes on both, causing constant displacement by the action of the muscles; better be two narrow than too deep.

Sometimes the teeth and gums are made too full in front, causing not only too much fulness of the lip, but the muscles become so drawn against the denture as to constantly force it backward, in those mouths when the process is all gone, for there is nothing to prevent this movement.

Additional weight in lower sets seems to be absolutely necessary in such cases, though I am not sure but the weight in some mouths causes additional absorption.

In the articulation of partial lower sets with an upper, only the lower anterior teeth remaining, the pressure should always be on the artificial, so as to relieve pressure on the front teeth.

But, if there are natural teeth on the upper jaw, lower partial sets should never be articulated in such a way as to throw the pressure on them, as there will be constant irritation of the jaw, because the jaws will close firmer on natural than on artificial teeth.

In articulating partial upper sets of scattered teeth, throw the pressure on the natural teeth entirely, as pressure on narrow spaces of the gums always irritates. Besides, the artificial denture can be used more successfully.

Whenever your own or another's patient calls and complains of the plate loosening, always examine the articulation first. When a plate has been worn many years, the bearings change, and in such a way as to cause displacement. Sometimes grinding will remedy it, and sometimes it will be necessary to remove the occluding teeth and lengthen them, if it is a rubber set; if continuous gum, the ends of these teeth can be built up with porcelain.

When the lower jaw is prominent, and the most of the teeth remain, the upper front teeth should be arranged even with, but not to meet; or placed inside the lower; the bicuspids and molars a little inside the outer cusps, and the bearing mainly on the inner cusps, to throw the pressure toward the inside the alveolar ridge.

If the fronts are set *inside* the lower teeth, they may meet, the pressure in that case being favorable.

Very many sets of teeth are too short; rarely have I seen them too long. This not only gives a bad expression to the mouth, but often causes discomfort by allowing the lower jaw to come too far forward, vainly reaching for a resting place, and producing a tired feeling, and preventing successful mastication.

With many patients, however, all the conditions of the mouth are unfavorable to the successful use of artificial teeth, and such patients wonder why they can't at once use teeth as their neighbors do. With such the dentist may use his best judgment, looking at the difficulties in all their bearings, sparing no pains to do his best, and then explain the difficulties, and give them to understand that they must exercise much patience, and that in time they will learn to use them successfully.

One point, however, must be insisted on: If the plate irritates, go at once to the dentist's to have it relieved, for aside from the pain suffered you cannot masticate successfully under such conditions, for, in closing the jaws, you will endeavor to close in such a way as to avoid being hurt, and thus the plate is displaced.—HASKELL, *Items of Interest.*

ANCHOR PINS.

For some time I have been using the double headed pins used by the manufacturers of artificial teeth, as anchor pins in filling badly decayed and broken down teeth, and have come to regard them as valuable in saving such teeth.

If exposed, destroy the pulp and fill the root canal with a gutta-percha cone. I follow this with filling the pulp cavity with oxyphosphate, and before it hardens I put in one or more of the pins so that their round heads will project into the cavity far enough above the surface of the cement to act as anchors for either a gold or amalgam facing, and pack the cement closely around the pins. I wait awhile and then remove the excess and clear the margin of the cavity before it gets hard.

When it has hardened sufficiently I make a shallow cavity with the heads of the pins projecting into it. Around them I anchor the gold or amalgam.

For incisors I use one large pin, and for biscuspids or molars, two or more pins, slanting them so as to give them greater strength.

I have built up incisors, cuspids, bicuspids, and molars in this way where it seemed impossible to get retaining points sufficient to hold a filling, and have made good useful teeth of them.—West, *Items of Interest.*

YOUR NAME PLEASE? HOW CAME YOU BY IT?

With the increase of population in any given locality it becomes necessary to adopt some means to distinguish between those of the same name; hence a tell-tale or descriptive epithet was tacked on. There were four ways in which this was done. We read of Simon Barjonas, that is, Simon the son of Jonas, Simon of Cyrene, and Simon the Zealot. The first is a patronymic or name derived from a parent; the next is a local or place epithet: and the last a descriptive or personal name. A fourth Simon might have been called Simon the Fisher, from his occupation. In this manner all surnames originated. About the middle of the twelfth century they became fixed or hereditary. Before that they had died with the possessor, father and son having different surnames. Names ending in son are patronymics; so are most of those ending in s; Evans is Evan's son. Mac, Fitz, and O' denote patronymics, Mac being the son, and O' the grandson, Fitz is a corruption of the French fils, son.

No country is more dotted with names than England. From the Hebrides to the Isle of Wight, from Anglesea to Dungeness, it has been named and renamed by the successive people that dominated the land—Saxon, Dane, and Norman. These old roots form a list of words that signify hill, dale, heath, vale, knoll, plain, wood, grove, stream, ford, port, and fort, and enter into at least two-thirds of purely English surnames. They were gradually woven into the appellations of the people by particles like at, in, or *de*, mostly indicating the fact of residence or of belonging, and which were often dropped or incorporated.

Such place-names are many. "In old registers we find John-above-the-Brook and Thomas-at-the-Town's-end. Their descendants are known as John Brooke and Thomas Townsend." Of Norman origin are such as Thomas-à-Becket and Thomas-à-Kempis—the first denoting the man who lived at the becket, or little brook; the second the man who dwelt near the camp. Surnames derived from personal names or nicknames are legion, such as Armstrong, Longfellow, Lightfoot, Redhead, Sleeper, and Doolittle.

Names derived from the occupations form a large class and a very respectable one. Archer tells us of the famous English long-bow; Thatcher calls up pleasant visions of cosy cottages thatched with straw; Shepherd reminds of a flock of sheep, for which, even at this day, the great rolling upland downs of the southern coast are famous, the scanty soil covering the chalky cliff being fit for naught else but grass. The Baker was sometimes called the Bakester, which in time became Baxter. Furbisher, or Frobisher, was the man who polished and repaired the armor, dented and rusted in many a hard-fought passage at arms. Spellman was the wandering minstrel, who recounted "o' winter nights," by many a roaring chimney-side, the deeds of derring-do accomplished by stout English hearts by flood and field.

Most English surnames date from the Saxon and the Norman conquests of Britain, though a very few may be traced back to the time of the Roman and Danish sway. In all of them may be found a record of the life of the period to which they belong, and a picture of the social forms and conditions. Thus, Page, Thrall, Spencer, Knight, Squire, Dean, Ewer, Lord, King, Sargent, Waite, Carver, Hors(e)man, Falconer, all indicate early distinctions in the social and political constitution of the times. Such names as Butler, Brewer, Hall, Brewster, Churchill, and Fowler, speak for themselves. "The Fowler, with his net and bow-gun, shot the air for winged game; the Foote dwelt at the base of some cliff or hill; the Hall (or Hale) was a humble retainer, dwelling in the shadow of the feudal stronghold; the Brewer or Brewster, compounded vats of good English ale; and the Butler, or Boteler, looked after the cobwebbed wine-tuns." Banister was the keeper of baths; Knowles, or Knoller, tolled the funeral knell; Monger was a chapman or peddler; Storer a warehouse-keeper; Tubman was a cooper; Sherman, or Shearman a cropper of sheep's wool; Woodruff was a wood-reeve or steward; while the first Webster was a weaver.

This aristocratic Osbornes and Westbournes come from Austerbourne and Ousterbourne, the South-stream and the West-stream, respectively. Parkhurst, a name native to the richly wooded counties of Sussex and Kent, means literally, a thickly-planted park. Palmer, carries us back to the era of the Crusades. When the champions of the cross reached the Holy City, they carried palm branches in their hands in token of victory over the Paynim, and the returning Crusader was dubbed a palmer. Parmelee may have sprung from Palmer and the lea, or ley, *i. e.*, ancestral domain, of the returned palmer. The first Parker looked after the deer-park of some lordly noble. Paton, another blue-blooded surname, both in Scotland and America, was in its first form Patten; pattens, or clogs, were worn by the clergy to protect their sandaled feet from contact with the cold stone aisles of the churches, and survive to this day in European lands in curious iron or wooden shod shoes for rainy weather.

The Lees, Leas, Leys, and Leighs are all kindred, the original, lea, denoting a mellow pasture-land common to Lincolnshire, where there is a regular saying, "As many leas as fleas." Lathrop is lang thorpe, long village. Floyd is a corruption of the Welsh Lloyd. Lusk, Lush. and Lusher are all sprung from the Norman French *lasque*, slothful, or rich and indolent. Gillette is simply "little Gill," the diminutive *ette* being added thereto. Hallock, or Halleck, is holly and oak, whence by another twist we have Holyoke. Hyde harks back to the time when "a hide of land" was a common form of measurement.

Hubbard, Hewett, Heuitt, Hughes, Hugo, and perhaps Hutchinson, are all stems of Hugh and Hubert. Allen, Allan, Alan, Alvin, come from the Saxon Alcwin. Ball is a shortening of Baldwin, as is Austin of Augustine. Blake or Black are from the Anglo-Saxon *blak*, to bleach or whiten. Bowen is a corruption of the Kymric ap-Owen.

The family of Pratts, in order not to dishonor their names, should be great gossips, for they are all descended from prate, or prattler. Phipps is a contraction of Phillips, as is also Phelps, by way of Phelyps. *Low* and *law* are English and Gaelic for a hill or a mound; *lud* means the people, and ward means an enclosure; hence by compounding these four words we get Ludlow, Wardlaw, and Wardlow. Dud, a Saxon earl, built a stronghold in Worcestershire about the year seven hundred; lea, or ley, as we have seen, means pasture-land, and in this wise arose the noble name of Dudley.

Bailey and Baillie are from bailiff; Barker was a tanner who used bark; Bradley is from the meadow where Brad set up his homestead; Bullard is the bull-ward, who managed the once popular sport of baiting the bull. Rushton is a field of rushes; Cauldwell or Caldwell is Scottish for cold well; Caulfield is cold field; Cranfield is crane-field, the field of the crane; Douglass is from *dhu*, black, and *glas*, river, and is at least as old as the eleventh century.

The griffin, that fabled monster, whose counterfeit presentment looked down from many a gargoyle, also was used as a sign for an inn, and so John-at-the-Griffin became plain John Griffin. Swine were, and are, often named bacon, just as we speak of a bullock as a beef; and finally the swine-herd himself received the name of Bacon. Clarke or Clark is the present English pronunciation of clerk, and is derived from that office. Chapman is "cheapman"—the forerunner of the "cheap Jack" of later times.

Choate is from the Anglo-Saxon *sceotan*, to shoot. From Gregory we get Gregg, Griggs, Grigg, and the valiant Gregor. Goodyear is simply goodman, or husband, and still survives in Devonshire. Chit, a tender twig, a child, gives us Chitty, and by adding the suffixes *en* and *den*, the latter meaning a wooded valley or glen, we get Chittenden. Crampton is merely *cramp ton*, a crooked or confined enclosure.

Throughout England to-day there survive in many localities memories of the old custom of marking the scene of some notable event by a cross, such as Tottenham-Cross, Charing-Cross, King's-Cross, Banbury-Cross. From this usage we get a group of names, as follows, and with which we must terminate this rambling paper: Crosby, the village at the cross; Crossley, or Crosley, the meadow by the cross; Crossman, the man by the cross; and Crosswell or Croswell, and Resswell or Creswell, the cross by the well.—Reddall, *Demorest's Monthly Magazine.*

THE COLLECTION OF DENTAL FEES.

The conversations I have had with many dentists since I have been in practice brings me to the conclusion that there is something radically wrong in the methods of business followed by most of our dental practitioners.

Dr. Thayer, of Brooklyn, N. Y., in the December *Archives* makes a strong argument for the cash system. Dr. Hazzard, a physician of our city, wrote a telling article for one of our morning papers, in which he claimed that many physicians practiced medicine for glory. This I think might be the case with some doctors of dentistry, if we are to judge by their slowness as collectors.

The cash system, as laid down by Dr. Thayer, does not seem to be feasable in practice, as most of the members of the St. Louis Dental Society find it.

But their is something wrong, and we as a society should take some steps to remedy the evil. To prove this, compare at any time the work done with the cash received. How many members of our society can collect, or have collected during the past year, 1887, all of the fees earned? The lack of the ability in dentist, to keep the business well in hand and to collect promptly all money coming to them for professional services is known to all of us. The question is one every dentist would like to have solved in his favor. If we could say on the last of each month that every patient had paid his, or her bill in full to date there would be cause for congratulation, and we might pay more promptly for our dental journals, or do many other little things, such as attending dental meetings, etc., or pay for some of the common necessities of life.

The professional man who collects promptly and does fairly good work is the one who may be considered a success. You can almost tell, from the looks of things generally, whether there is plenty of money coming in every month, to pay office expenses, for new instruments, or to keep up the personal appearance of the dentist himself. They seem to lose the incentive for anything very good, and are content to just exist. You ask them to contribute a few dollars to any cause that is to elevate or protect the profession, and the answer is, "I am too poor," and this is very often too true. Would it be so if they received their fees?

The dentist is always to blame for this state of things. When a new patient comes to our office do we tell them what the probable cost will be, and ask a fee for making such an examination as is necessary to do this? If you do, it is too many times in the nature of a bid, as many are afraid they might lose the case. To keep up your standard never make your fee less than you can do the work for, in the best manner your skill will allow.

By approximating your expenses and letting your people know how you do business, you will save many a misunderstanding, and will facilitate the collection of the bill.

Never refuse money in advance. Cash deposits are always conducive to satisfaction and they sometimes save your own individual credit. Commence to get your pay immediately; try and make the last sitting the time of the last payment. By so doing you will save stationery, postage and collection fees, which during the year amount to good interest.

Keep a correct record of all work done, so that after twenty or forty years you will not hesitate to say, after looking it up, this or that is my work, and I did it on such a date; there should be two copies of the record, one at the office, and one at the residence. Never allow a person to ask you for a bill that you do not give it immediately.

Those cccounts you have failed to collect by the last of the month, should be sent out promptly on the 1st, 10th, or 15th, just as you may think best, only make it at some stated time.

Use the mails for the first presentation, then a collector for those who do not respond immediately. Tell your people you intend to do this, and adhere to it. Never hesitate to present a bill if you have honestly earned it, and never be afraid of losing a patient because you want your money. You had better lose the price of one operation than two or more. It is very seldom you lose anything when you are doubtful, and push the collection for that reason.

The members of the profession should keep each other posted on the shoppers, etc. These are not bad people to work for, when you do not give them credit.

When you do charity work, do it with a good heart. Those you cannot afford to treat, either send them to some one trying to get a practice, or to the dental Infirmary. Persons in moderate or comfortable circumstances are usually the best pay. They want to know how much their bill is to be, and make provisions for this special purpose.

People of wealth or social position oftentimes presume upon their name or influence, and keep you waiting indefinitely, and when they do pay, seem to think they are doing you a great favor.

Do not feel offended if some of your people try other men; that is their privilege, and do not think your brother dentists are taking an unfair advantage of you if they serve them. None of us own our patients, and it is a good thing we do not. It makes us more careful in our treatment of them.

In conclusion let me say :

1. Tell the patient, whenever possible, what the expense is likely to be.

2. Do not make it too cheap, for thorough and conscientious service.

3. Do not feel offended if some go elsewhere.

4. Take all that come to you in the regular course of business.

5. Try and make the business a cash one.

6. Collect promptly, and when you cannot collect, stop work until the bill is paid.

7. Treat your people with the utmost courtesy. Never allow yourself to be other than a gentleman. Always be firm, kind and conscientious.—CONRAD, *Archives of Dentistry.*

EFFECT OF FOOD UPON THE TEETH.

The object of my experiments, as stated at our last meeting, is to determine whether or not the teeth, either during their development or at ony subsequent period, may be influenced by the character of the food given; in particular, by an abundance or by a lack of lime-salts. This I consider to be a question which can be settled by experiment alone, individual opinions being, as then stated, very nearly worthless. It is true that the majority of experienced dentists with whom I have spoken on the subject have answered my question in a positive sense, without, however, being able to give any conclusive evidence ; others are of a directly opposite opinion, and for no better reasons. I take this opportunity to state that my object is not to support any particular view, but to obtain results upon which an opinion may be scientifically based. I showed in my paper last year, which was simply an introduction to the subject, that under certain specified conditions the amout of lime-salts taken by children is less than that necessary to properly build up the osseous system. I also made a number of experiments on grown dogs, obtaining results of which I said : "Although on the whole it might appear that a change had been produced in the proportion of lime-salts to organic matter in the teeth, yet the number of experiments is too small and the result not sufficiently positive to admit of drawing any definite conclusions."

* * * * *

During the last twelve months my experiments have been made exclusively on young animals (mice and dogs). Attempts at experiments on cats failed through the premature death of the animals. In each series of experiments the litter of pups or mice was separated into two groups, one of which was fed normally, the other on artificial milk (containing all the constituents of milk except lime,) sugar, fat and peptones. You will all be convinced as to the effects of such a regimen upon the bones, as you see the epiphyses are exactly like little sponges, and the shafts can be tied into knots. As for the teeth, I have been very much surprised to find how very little they seem to have been affected, both as to time of eruption and the development of the roots. What the effect may have been upon the chemical composition I cannot state, as the analyses have not yet been made, nor do I wish to enter into a discussion of the matter until my experiments have been completed. My results, so far, I may say, appear to be markedly different from those of Galippe, who is of the opinion that the teeth are the first to be affected. I found the bones decidedly more altered, at least macroscopically, than the teeth.—MILLER, *Independent Practitioner.*

CHILDREN'S TEETH.

A masticating apparatus for a growing child is just as necessary as for a man, and it is unfortunate that we cannot do much for them because of a lack of knowledge by parents as to the necessity for their retention. I do not know that I can censure either the parents or the family physician. If parents would take in hand the care of these teeth, the general health of the child would be greatly improved. It is fortunate if they do not fall into the hands of a man who considers his time too valuable to be wasted in cultivating the management of the child. I have been especially careful to retain the *temporary cuspids* and *second molars* until they are "exuviated" as Dr. Patrick says. There is not as great danger to the regularity of the permanent set when the temporary first molar is lost as the second molar and cuspid. In spite of the theory that if all the temporary teeth were removed there would be no greater liability to irregularity of the permanent teeth, forces may be, and are, at work that tip foward the permanent first molar and close up that space. If we can retain the temporary first molar until the ninth year, and the second, until the tenth or eleventh year, depending on the locality, we will assure to a great extent the regularity of the permanent teeth. How accomplish this? By the exercise of a great deal of patience and the judicious filling of the teeth. Each tooth must be judged when it presents itself and be treated accordingly. When there are proximate decays and the pulps dead, the phosphates do not commend themselves for filling. You will get better results from the gutta-perchas than from amalgams, or cements, or tin and gold, or tin alone. Base-plate or red gutta-percha is more easily replaced and does not wear away as rapidly as Hill's stopping or other gutta-perchas having mineral constituents. I often bridge the space between two molars with gutta-percha and have good results. If you leave the space food lodges there and in picking it out fillings are dislodged, so I prefer to bridge it. Have never bridged with amalgam. I bridge over only in certain cases ; not all cases mind you, and only in living teeth. I never bridge over when the pulps are dead. The roots of pulpless teeth are absorbed or dissolved in a different manner from those of living teeth. If they do not come away when it is time for the irruption of the permanent teeth I extract them if I know them to be pulpless.—HARLAN, *Dental Register.*

DON'T.

Don't accept it as a rule that a poor man is a poor doctor, or a young man a young doctor.

Don't suppose because he is a professor that he is a little tin god, with a bell and a "yaller" ribbon.

Don't let your foot-notes contain all the sense and essence of your articles. Some contributors mar every page by copious footnotes.—*Exchange.*

Don't oil and varnish a plaster impression. Don't vulcanize rubber ber on a plaster model, without first having coated over with liquid silex (silicate soda), allowing a few minutes to dry or harden, and don't allow the model to become too old and dry. Don't have any surplus of rubber, and don't, upon any circumstances, put the brush with which the model was painted or coated back into the bottle of silex, without first having washed the brush thoroughly. Better still, don't put the brush into the bottle at all, and don't allow a piece to remain in the vulcanizer longer than is just sufficient to properly cool off. Don't use iron flasks ; don't put the flasks, vulcanizer and bolts away without first having washed all (hot water preferable), and dried and oiled the latter. Don't heat or soften wax, or modeling compound impressions, in hot water for the purpose of separating a plaster model from it. Don't melt the wax in modeling up case for investing, and above all things, don't get melted wax smeared over the model where the rubber comes or will come in contact with it; and don't expect to see a joint in gum-block-work come out clean if you have allowed a particle of wax to remain between the joints, or put the case in a dirty vulcanizer.—MOORE, *Archives of Dentistry.*

CUTTERS AND CLEANERS.

Dr. Marriner told us several years ago, that our chisels were nearly all too coarse, too thick and heavy, and told us why. I have acted on that hint ever since, but in order to do so have had to make several for myself, and grind down those that I have bought. A thick, heavy chisel is rarely needed, and whoever gets used to the more delicate forms will wonder how he ever got along without them.

The use of simple, plain, but thin and sharp chisels, does away largely with the necessity for separating files and disks; and let me say in this connection that I am a believer in somewhat heroic chiseling. Many operations fail because of timidity on the part of the operator in cutting away weak margins, already tainted with decay, or liable to be broken.

As we all like to do as much as possible with the instrument we have in hand rather than take the time and trouble to change, I wish to call your attention to a form of chisel possessing the greatest number of possibilities of any I know. It is the one which stands in the S. S. White catalogue as No. 45. There are smaller sizes, 44 and 43, but if 45 is kept sharp, it will grind down to the smaller sizes soon enough, and the operator will never lack for those.

As the instrument comes from the maker it is rather clumsy—the blade being twice as thick as it should be. I used one for a year before it occurred to me that I could improve it by grinding it down thin.

It is a great chisel for fissures, especially in lower molars. It cuts forward and backward—by a turn is changed from a right to a left. It should be held as one would hold a pen, steadying the hand by the third and fourth fingers on the front teeth. The "push" cut is made with the "muscular" movement of penmanship—that of the arm; the "pull" with the "finger" movement.

Another useful form of the chisel is one with concave edge, for beveling or rounding the edges of cavities, preparatory to filling. The set of Dr. Talbot is based on this principle. I have only two, home-made.

EXCAVATORS.

An excavator, as before said, is only a form of chisel. As it is formed for making an excavation, it should agree somewhat in size and shape with the place to be excavated. For a long time we used square cornered instruments where we should have used round.

The "spoon" shaped and "rapid" excavators were suggested by the right idea—that of having something to slip under the decayed dentine, and lift it out.

No great variety is needed. One or two nearly straight, two or three with slightly curved shanks, and about two or three pairs of rights and lefts will do the work. We seldom have need of the larger forms. It does not follow that because a cavity is large, we need to scoop it out all at once.

I conceive that a curve blade excavator like the "spoon" is better adapted to easy cutting than a straight hatchet or hoe, because the force may be exerted in the line of the blade. There is the same difference that obtains in favor of paring an apple instead of scraping it.

There is less force required, and less irritation to the sensitive matter in the dentinal tubuli.

I think that without great inconvenience we could dispense with nearly the whole list of hatchet and hoe excavators. A few special forms are required, as for example, two or three long hatchet blades for reaching down into deep proximal cavities in bicuspids and molars, two or three narrow blade hoes for retaining grooves in surfaces not directly accessible by the engine. But in these cases we may often do the work with greater ease, quickness and certainty by means of the right angle attachment and round burs.

SCALERS.

I believe that there is no class of instruments so little studied and so imperfectly understood, and I may add so little used where they should be, as the scalers. The removal of tartar from the teeth is not done as it should be once in fifty cases, and a principal reason is found, not in the insufficient *number* of instruments, but in the lack of a very few that are really adapted to the work.

Many of the so-called scalers in the market are distressingly clumsy and unwieldly. They are utterly incapable of accomplishing their work with anything like thoroughness. They require for their use the exercise of an amount of force not called fcr with proper instruments, properly directed.

Where do we want to apply our force? Why, just at the line of union between the tooth and the tartar, of course. Now, a half dozen instruments are all we need in the great majority of cases to clean a set of teeth, and thoroughly. One or two small chisel scalers—after Cushing—thin, delicate, curved, will, in the majority of cases, remove the deposits nearly all the way round the tooth, and with the exercise of but little force. A right and left curve chisel for the gum margins of bicuspids and molars, something like Harlan's. One or two "hook" instruments for reaching up in certain locations beneath the gums, and a three-sided point, nearly after the Riggs' pattern, will complete a set sufficient for almost anything in this line of work.—NEWKIRK, *Dental Review.*

MEANS TO A GIVEN END.

In educating a man for any occupation some regard must be had to the circumstances under which he is to carry out the same. A young man brought up in the belief that everything must be done with gold, and that, too, with "hard gold," and that in every case the tooth must be restored to its original shape, and that the gold must have exactly the same density throughout, and a surface as bright as a mirror, *might* make a living in New York, or some of the larger American cities, but if he were put into a German city of 10,000 to 40,000 inhabitants, I doubt very much if he would be able to collect a practice. The great majority of the students from the dental institute set up in practice in cities where it is absolutely necessary for them to make many operations in plastic materials, and where, if they do good work, they must do it at inferior prices, and where they will be obliged to sacrifice to the forceps many teeth which could be saved. The mass of the German people must first be taught the value of good conservative dentistry, before they will put any confidence in it, and before they will be willing to pay for it, and this teaching is not a matter of a few days, but of many years, and they must learn by *experience* that fillings can be made which will not fall out the next day, and that it is not necessary to extract a tooth as soon as it becomes carious.—MILLER, *Independent Practitioner.*

TEXT-BOOK ILLUSTRATIONS.

In looking over the various text-books and other publications dealing with microscopical subjects, one cannot fail to be impressed with the clear, fine-cut appearance of the usual illustrations. To one not familiar with the subject, a study of many of these illustrations should lead him to the conclusion that microscopy, so far as observation goes, is not a difficult thing to master. And this, indeed, has been the case, in our experience, with students who have come to us for instruction in histology. The first rude awakening often comes to the beginner when he takes his first text-book cut as a guide to lead him through the intricacy of his first mount. Everything looks so differently from what he expected, and even the instructor, in attempting to point out the features so clearly displayed in the cut, will, for some time meet with but feeble success. It may be urged that the difficulty is that the eye requires a special training to enable it to convey a correct impression under conditions to which it is not accustomed. This is very true ; but is it the only reason for such complete (and not uncommon) failures to see anything at all ? It seems to us that one cause of failure is to be looked for in the illustrations, and the reason is, generally, they are too diagrammatic. We think that the better class of illustrations in question are very helpful to the advanced worker, not because they are true pictures—for they are not—but that he has learned to take something for granted and to make just the proper allowances to enable him oftentimes to know exactly what the artist intended. No specimen, however well prepared, can show clear differentiation of its component parts as the illustration which represents it. The latter has caught the general features, exaggerated them and bothered not at all with the spirit of its subject. The aim, moreover, has been, apparently, to picture the specimen, not as it looks, but as it is. For the benefit of the beginner this should be reversed : he must first learn to see the specimen as it looks, and then taught to know it as it is.

The difficulties at the root of the matter seem to be (1) the fact that the delineations are not confined to that which is seen at a single focus, but are deduced from a knowledge gained by a study of several focuses, and (2) the process employed.

(1.) It is this which makes complete tubules in a section where there are few, if any, and which fills up the indistinct spaces with ideal representations of that which though not seen, is known to be there.

(2.) The process usually employed makes use of distinct lines, something seldom seen in a specimen. A skillful artist could probably etch a tolerably correct picture, and he would do so by carefully toning down his lines to the proper degree.

Photography and many new processes are coming into use, some which, it is hoped, will prove more satisfactory. And yet we think that much better work could be done with the method now in vogue, (drawing with the use of a camera lucida and photo-engraving the result) if the artist confined himself to drawing that only which he sees at one focus, and conserving that blending of parts which, though sometimes amounting to indistinctness, has at least the merit of being natural.—Editorial, *The Microscope.*

BLOOD-CHANGES.

The Paris correspondent of the *New York Medical Journal* says that the application of spectroscopy to the study of patholigical alterations in the blood is receiving considerable attention in that city. So far, the considerable expense of the large instruments employed has to a great extent prevented any use being made in medicine of the principle characteristics of the coloring-matter of the blood, either in the normal or in the pathological state ; but a late invention of Dr. Hénocque's places in the hands of the medical profession a handy, portable hæmato-spectroscope, that will almost go into a waistcoat pocket, and with which a spectral analysis, both qualitative and quantitative, hæmoglobin and its derivatives (oxyhæmoglobin, methæmoglobin, etc.), can be made at the bedside. But it will be asked, What is the advantage of knowing this ? Well, it has been proved to be of the utmost importance in the study of the variations of the activity of the reduction of oxyhæmoglobin in health and in disease. This Dr. Hénocque makes us *see* with his instrument applied to the thumb. A small elastic-band ligature is tied around the lower part of the thumb, and on the hæmatoscope being applied to the nail, which is exposed to the usual daylight (as strong as possible, but that from a house-window is enough), the energy of the exchange going on between oxygen and the tissues can be seen. This new idea is of great practical importance in the study of the phenomena of nutrition, both in physiological and in pathological states; so that such physicians as Professor Germain Sée are now taking the matter up and applying it to the study of many pathological states, such as anæmia, etc. Dr. Hénocque is one of Professor Brown-Séquard's best men. He has given the results of some three hundred and seventy cases in which experiments were made.—*Science.*

THE SIXTH YEAR MOLAR.

Its title to longevity can only be questioned under neglect and abuse.

It is the keystone molar; with it the integrity of the arch is preserved; without it the usefulness of the arch is impaired, if not destroyed.

Its extraction at an early period signifies a loss of masticating surface that is absolutely detrimental to the health and comfort of the patient in early life.

In view of the prominent position it occupies in the arch and its relation and influence as a just poise or balance in the distribution of the varied strains incident to mastication, its extraction can only be considered a physiological mistake.—WELD, *Independent Practitioner.*

"AS I LIVE, A GENTLEMAN!"

President Kingsley: I said to you yesterday, with what timidity I took this position. It was true. I did not know how I was going to fill it. I feared very much I should not like it at all. Gentlemen, I have changed my mind. It is one of the nicest places in the world, and it is you who have made it so; and the kindly consideration you have shown me all the way through is remarkable. I have been tripped up but twice, and I deserved it. I was tripped up by Dr. Atkinson, who is the only one, I think, who could do it. Your kindly consideration has smoothed the way, and everything has gone along so evenly and harmoniously that I look at it with surprise. Now that I think of it, it is not all due to you. I think some of my easy and pleasant experiences here have been due to our fair visitors.* It is the first time in our history that our association has been graced by the presence of the ladies, and I assure you that at times I have looked from behind my desk where I have been barred away from them, and seen the pleasure with which some of my confreres enjoyed sitting near them, and I felt jealous, but nevertheless, they have done much to strew my path with roses and pin them in my coat.

Ladies and gentlemen, I again thank you for the consideration you have shown me, and I hope that in another year we shall meet with as kindly feelings as we now separate. I now declare this meeting adjourned without day.—*New York Transactions.*

HOW DOES THE BLOOD CIRCULATE?

I imagine some of your readers will say: This is a curious question for one to ask who passed an acceptable examination in Anatomy and Physiology more than thirty-one years ago. J. C. Dalton, one of our best authorities says: "The arteries may be regarded as a great vascular cavity." He also says: "The entire blood is moved by the impulses of the heart." To me, one of the wonders of the circulation of the blood has been that we never find blood in the arteries after death, although we do sometimes find it in the heart. The ancients supposed they contained nothing but air, so for this reason called them "arteries." I could never understand who or how the last beat of a heart, whether it emptied itself or not, should or could drive every drop of blood from the arteries. My understanding may be dull but my inquisitiveness is not. An autopsy that I recently witnessed has shaken my belief considerably in the "hollow tube" system.

Some twenty-five years ago the patient was driving a spirited horse, and as a rapidly driven horse came up beside him his own horse gave a jump forward, and as the driver pulled up suddenly he felt as if something had "given away" in the region of the heart. He was taken into a house where he remained some hours in great distress; for years following he had attacks of a similar nature, *i.e.*, sharp pains in the region of the heart. At the autopsy it was found that the mitral valve had been ruptured, and that this valve was simply a network, or a number of longitudinal cords, worn smooth. The walls of that side of the heart were thin, the cavity dilated, and, as is usual in such cases, the other side was enlarged, and the walls thickened, which is generally attributed to overwork like a "blacksmith's arm." Aside from this the aorta for some distance was dilated, and the walls or coats thickened (probably from overwork). Can it be possible that that valve like a network had propelled the blood through the system for years?

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* There were several ladies in attendance, two of them members of the profession.

Having seen the blood circulate through the web of a frog's foot I decided to try the experiment myself. As frogs were scarce but flies plenty, I caught a large fly and proceeded to fasten a wing under my microscope. I was fortunate beyond expectation and "builded better than I knew," for after I got the wing in position, and was watching the blood circulate, the fly tore away, leaving the wing in position. Imagine my surprise when I saw the same beating, wave-like motion continue, unchanged by the departure of the fly, drop after drop, granule after granule, starting, stopping, starting again, till the last drop or granule had disappeared. The wing had "bled to death." I said to myself: Is not this the great secret of the circulation? Is not this why a little muscle, weighing but one-half pound, can keep ten or twenty pounds of blood in rapid motion for years, sometimes a century, and during much of that time nearly half of that blood is being raised nearly perpendicularly? If the muscles in the arteries of a fly's wing can continue the circulation without the assistance of the heart, can they not—do they not—at all times assist the heart in propelling the blood, even acting after the heart ceases to beat, driving the last drop of blood beyond their terminal extremities?—Cushing, *American Homœopathist.*

FAILURES AT THE CERVICAL MARGINS.

The most common micro-organism found in the mouth is the leptothrix buccalis. We have never been able to cultivate it, and consequently know very little about its connection with decay. What most interests us as a profession is how to preserve teeth after we have been called upon to treat and fill them. The failure of fillings at the cervical margins I consider is in many instances due to the granulation tissue developed in that position by reason of the irritation to the soft tissues by poorly-finished fillings. It is a fairly well-established fact that such granulation tissue produces lactic acid, which, coming in contact with the tooth-substance, produces decay. This may be seen best in cases of fungous or luxuriant growths of granulation tissue, the result of misfitting plates or clasps. Here the teeth may be found to be very sensitive at the point where the tissue comes in contact with the tooth. The acid secreted in such cases is probably lactic, a very little of which goes a very long way in producing decay. Dr. Miller brought out a point in regard to its action a year ago last summer, and that was that it would not be satisfied with carbonate of lime. After making a saturated solution of calcium carbonate in lactic acid, pieces of dentine placed in it were still decalcified. Decay is the result of acid disintegration of tooth-substance ; antiseptic treatment in the mouth consists in keeping the fluids of the mouth neutral at all times. Now, this can be accomplished in various ways, as many causes conspire to produce an acid condition ; so we must be conversant with each and every cause, and direct our energies toward their removal. Where micro-organisms are concerned, use germicides ; where diseased conditions of the mouth exist, treat the local conditions ; where constitutional derangement is present, direct your attention to building up your patient's general health ; where misfitting plates, or clasps, or roughly finished fillings are at fault, smooth off the sharp corners and cauterize the unhealthy granulations. In a word, keep a perfect hygienic condition in the mouth at all times, and decay will be less frequent, fillings will last longer, and your reputation will be enhanced.—SUDDUTH. *Dental Cosmos.*

TIN AND GOLD AS A FILLING MATERIAL.

The ideal properties of a filling material are generally stated to be:—1, hardness ; 2, indestructibility ; 3, adaptability ; 4, suitable color ; 5, non-conductivity ; 6, ease of introduction. It should furthermore, 7, not injure health ; and, 8, be but slightly injured during the operation of filling by the entrance of moisture.

I doubt if there is any material which can be said to possess so many of these desirable qualities in so great a degree as does the combination of tin and gold.

The hardness (1) of such a filling is, at the beginning, not much greater than that of a tin stopping ; but in the course of a few weeks a remarkable change takes place by means of chemico-physical influences, and it becomes so hard that it will last for years without any or but little perceptible wear.

(2) The fluids of the mouth have no effect upon the material—*i.e.*, do not dissolve it. After the change to which we have just referred takes place, the stopping remains invariable.

As regards permanent adaptability (3), no filling material, with the exception of the several cements and prepared gutta-percha, can be compared with the combination of tin and gold. This material is extraordinarily soft, and is with great ease adapted to the wall of the tooth ; further, as a result of the remarkable change just mentioned, a slight expansion of the material takes place, which hermetically seals the cavity, even when the operation seemed somewhat defective. But, of course, such a result is only expected when the material is well condensed. It would be a fatal mistake to take it for granted that this material will act like a sponge when the filling is superficially condensed and inadequately prepared, and to suppose that it will swell and by this process become a good stopping. I will here only impress the fact upon you that a well-made and finished filling of tin and gold will, in consequence of the slight expansion which ensues, become so well adapted to the walls of the cavity, and also remains in such good contact with it, as would not be expected of gold.

In this respect, also, tin and gold presents a strong contrast to most of the amalgams. The so-called platinum, gold or silver amalgams contract after a certain length of time, although at first they may adapt themselves to the form of the cavity. It is for this reason that I affirm that, in respect to *permanent* adaptability, amalgams are far exceeded by tin and gold. Those who will take the trouble to examine a large number of old tin and gold and an equal number of amalgam stoppings, may easily convince themselves of the truth of my statement. There is, as far as I know, but one exception to the general rule—that is, copper amalgam.

Concerning color (4), the odds are against tin and gold. The filling is at the beginning grey, and in many mouths retain this color ; in others, however, it becomes dark or even black, and is therefore not suitable for stopping in front teeth. On the other hand, in contrast to amalgam, this material never discolors the tooth substance, not even when it is employed to stop a cavity filled with saliva. It can, therefore, be used in unseen cavities in front teeth ; if, however, the labial wall of such teeth is very thin, the tin and gold may show through the transparent enamel. To guard against this, several gold pellets are first placed against the thin wall before inserting the tin and gold.

For all cavities on the distal surface of cuspids, as well as those on the lingual surface of incisors, there seems, as a rule, to be no contra-indication respecting color.

This combination is (5) a bad conductor and can therefore be brought nearer to the pulp than gold, and it can have (7) no injurious effect whatever upon the general health of the patient, or upon the mouth.

In regard to the rapidity and facility (6) of the introduction of this material into a cavity, it is in many cases about all that can be desired. A large filling on the masticating surface which can be built of gold in fifteen minutes may easily be made of tin and gold in five or six minutes; in complicated approximal fillings the difference in time is much greater. In central cavities, upon the masticating surface of molars, the work can be done much more quickly than with any other material, and I have occasionally inserted a tin and gold stopping in less time than is usually taken for mixing the amalgam or cement to be used, especially the latter when the acid is in crystal form.

This material is (8) not perceptibly injured by moisture, not even by the access of liquids during the operation. In effect it seems as if the chemical and electrical changes of the material, upon which its superior qualities to a certain extent rest, take place more rapidly when the filling is somewhat damp, as I have already explained in speaking of this matter at the Convention of Naturalists and Physicians in Berlin in 1886. Fillings which have been made under saliva are, after a lapse of several months, seldom to be distinguished from those which have been put in dry. But I do not wish to have it understood that the stopping must be put in wet, simply that it may be done when it is difficult to keep the cavity dry, or when it is deemed advisable by wetting the first pellets of tin and gold with the solution mentioned in the concluding chapter, to have an antiseptic after-effect, or to harden the material more quickly than is usually possible. The enormous advantage possessed by this one quality of the combination of tin and gold must strike even the most casual observer.—MILLER, *Dental Record.*

Dr. E. A. Bogue mentions *Filth Diseases*, a publication that groups as such, cholera, diphtheria, etc., and asks, "Is not decay of the teeth another?" Some will answer: "Verily it sometimes is."

Dr. Billings, of the Army Medical Museum, will signalize the removal to the new building, near the National Museum, by the preparation of an illustrated catalogue. It will contain drawings of all the crude and wet specimens of tumors, cancers, gangrene, etc., and other objects on exhibition in the museum, besides microphotographs of morbid tissues prepared by Dr. W. M. Gray, the microscopist of the surgeon-general's office. Each picture will be accompanied by a short description of the object illustrated, but there will be no discussion of theories. The work, when completed, will constitute a complete pathology, and will be a most valuable text-book for students and physicians.—*Science.*

CONDUCTOR'S DEPARTMENT.

MR. RAFTER'S PAPER.

Wet subjects are preferable in some respect to dry. Water is a wet subject, too wet, perhaps, when used to saturate twenty odd pages of a dental periodical, nevertheless we take pleasure in laying before our readers Mr. Geo. W. Rafter's article in this issue on "Micro-Organisms in Hemlock Water"—"Hemlock" being the name of the body supplying Rochester with what its citizens drink—or, to be more accurate, should drink, many of them oftener than they do.

As herein presented the paper contains matter that did not appear when originally read, a circumstance due to the fact that the Microscopical Section had not intended to enter upon a discussion of the subject at this stage of its work. The preident of the Academy of Science having, however, called upon the Section only a few days beforehand to furnish the paper for the February meeting, Mr. Rafter was designated by the Section, as its representative, to do the best that could be done on short notice, with what result the reader may learn for himself.

In publishing the paper it has been deemed advisable, therefore, to make such additions as are necessary to fully explain not only the work of the Section in question, but also its position in reference to the apparently increasing contamination of our local water supply. The paper in its present form will also serve to remove from the public mind much of misapprehension as to the meaning of a biological analysis of a water supply, and, if possible, make clearer the object of the Section's present plans and studies.

To those not familiar with water analysis, the presence of a great number and variety of micro-organisms would lead them to question its value as a potable water. Such questioning, however, is without justification, for with few exceptions the living things ennumerated thrive only in water best adapted to human needs. As to this particular supply, it has long ranked second, from a chemical standpoint, among potable waters, and there is no good reason for believing that it has fallen materially from its time-honored and high position anomg the reputable waters of the United States. The question now is, Shall it be kept there?

STATE MEETING.

Next month, the second Wednesday and following, the State Society meets at Albany for the purpose of holding its twentieth annual meeting. Preparations for some time back have resulted in the following to date:

Papers will be presented by Drs. L. D. Shepherd, of Boston, B. A. R. Ottolengui, of Brooklyn, William Carr and W. H. Atkinson, of New York.

The clinicians, so far announced, are Drs. H. A. Parr, of New York, E. C. Kirk, of Philadelphia, and E. Parmly Brown, of Flushing.

Final answers, a majority of them favorable to the Society, are daily looked for by the business committe from those who have been applied to for papers and demonstrations, a complete programme of which will be issued the latter part of the month.

The subject of a banquet at this fifth-of-a-century meeting is under consideration, regarding which the business committee is ominously silent.

Provision has been made for a large and varied display of goods by dental manufacturers, and it is thought that the representatives of both large and small establishments will gladly take advantage of the Society's special invitation.

Dr. W. W. Walker, 67 E. Ninth street, New York, is chairman of the business committee, and communications on State Society business addressed to him will receive prompt attention.

DENTAL COLLEGE COMMENCEMENTS.

The dental department of the State University of Iowa, held its sixth annual commencement exercises, March 5th. Number of graduates, twenty.

The exercises of the Ohio College of Dental Surgery, now the dental department of the University of Cincinnatti, were held March 7th. Forty-four gentlemen and two ladies—Mrs. Jessie Dillon and Mrs. Z. V. Swift—had conferred upon them the D. D. S. A. B. Fletcher delivered the class oration.

The forty-eighth annual commencement of the Baltimore College of Dental Surgery occurred March 8th. Dr. W. H. Phillips has our thanks for favors.

The Minnesota Hospital College commencement was held March 16th, and was followed by a banquet, in honor of the graduates, at the West Hotel.

" Doctor's Day " was duly celebrated in Buffalo, February 28th, by the alumni and graduating class of the medical department of the University of Buffalo.

MEETING OF THE SEVENTH SOCIETY.

The Seventh District Dental Society of the State of New York will hold its twentieth annual convention in Rochester, N. Y., April 24th and 25th. Arrangements are being made for a full and interesting meeting. Members of the profession are invited to attend.

The Society includes the counties of Monroe, Wayne, Cayuga, Seneca, Yates, Ontario, Livingston and Steuben. Dentists practicing in any of these counties, and who wish to become members of the Society, can obtain information on requirements for membership by writing to the Recording Secretary,

CHAS. T. HOWARD,
224 E. Main St.,
ROCHESTER, N. Y.

NEW YORK TRANSACTIONS, 1887.

The above publication is out, and will be received by district members from their respective secretaries, either at the district meetings or through the mail.

TIME AND PLACE OF DISTRICT MEETINGS.

First, April 3d, New York; Second, March 13th, Brooklyn; Third, April 17th, Albany; Fourth, August 15th, Saratoga Springs; Fifth, April 10th, Utica; Sixth, May 8th, Binghamton; Seventh, April 24th, Rochester; Eighth, April 17th, Buffalo. Secretaries are requested to forward reports to the State Secretary as early as possible after district meeting.

PRECEPTOR AND PUPIL CONTRACTS.

The above documents have been gotten out in the style common to law blanks, and may be had by members of the profession who are not members of the State Society, on remitting the usual price of such blanks. Members of the State Society will be supplied direct by the Secretary, and without charge.

MARRIED.

Dr. Louis Ottofy, Chicago, and Miss Nellie Freeman, Englewood, Ill., December, 27th, 1887.

Dr. S. E. Davenport and Miss Blanch S. Folsom, New York, February 21st, 1888.

PELLETS.

To reduce the melting point of gold add two per cent. of silica.

Cooper Medical College, of San Franciso, seems to be a most prosperous institution.

The Book Buyer, by Charles Scribner's Sons, is bookish throughout and handsomely illustrated.

To produce a polished surface on a plaster impression varnish, and when dry, brush thoroughly with precipitated chalk, using a fine shaving brush. In the case of the model omit the varnish.

Haskell says tin foil should be rubbed on the model with a cloth and then soaped. It will not then stick.

Items of Interest has, as a frontis-piece, a picture of Dr. George Watt, editor of the *Ohio Journal of Dental Science.*

"Careless editing" seems to be the leading editorial "fad" with the monthlies. No credit or wrong credit is the excitant.

Dr. T. M. Prudden has naturally enough demonstrated the presence of bacteria in ice. It was a cold day, of course, when they got left there.

The Childrens' Friend and Kintergarden should be in every family where there are children. The older members are not overlooked in its make-up.

Our friend Stockwell, of Springfield, Mass., is getting numerous and very flattering notices of his recent publication "The Evolution of Immortality."

"Oil of bays, (*huil de lannier*) if painted on walls, picture-frames, etc., drives away flies from the apartments." So does onion water applied with a brush.

Eucalyptus dissolves gutta percha; hence, to give a filling of this material a smooth surface, rub it with a bit of cotton (on a bur) saturated with the solvent.

Certain British dental periodicals credit an English member of the profession with the statement that Americans know something of dentistry. Thanks, awfully.

Make an impression in cuttle fish bone with the crown of the tooth that you wish to duplicate in gold, and fill with the molten metal, at the same time forcing it to place with a stiff spatula.

"Eucalyptus is sometimes disappointing," and simply because it too often comes from the spirits of turpentine bottle of the shops instead of Sanders & Sons', England. We have had the pure thing but twice—when first put on the market as a fancy drug, and again in '86, at Niagara Falls.

Immediate root-filling calls for the generous use of peroxide of hydrogen, followed by a dressing of corrosive sublimate. This applies in cases of putrescent pulp or blind abscess. In cases of immediate removal of the normal pulp, a simple washing of the root canal with carbolic acid is all that is necessary.

* * *

Imitation gold may be made by melting together 16 parts copper, 7 parts platinum and 1 part zinc. The copper and platinum are covered with borax, then with charcoal, melted and thoroughly mixed, when the zinc is added and the mass poured. It is easily reduced to plate or drawn into wire.

* * *

For the after-pains of teeth extraction: 1st, with cotton wound on the end of a wood tooth-pick, remove the clotted blood from the socket; 2d, syringe well with hot water. Pains of this kind often follow the extraction of teeth well on the way to alveolar abscess, but are easily allayed as above. More than that, the means for doing the work are always at hand.

* * *

In devitalizing the tooth-pulp, whether with the Truman formula (which should be especially prepared for each case) or other arsenical preparation, make the application as early in the day as possible. Late-in-the-day applications, if they cause pain at all, keep it up the better part of the night, or until the patient is worn out; and this worn out state of the whole organism may explain the hang-on character of the pain when once well under way.

* * *

The further extension of the dental college term is talked of in some quarters, which reminds us of a remark made by one of the most experienced teachers in the profession. He had been succeeded in a well established school by a man of his own teaching, and in answer to our question as to how his successor would get on, said: "He'll have trouble to get through his term." "How so?" "He'll tell all there is of it in less than three months. My own trouble consisted in finding something to say that I had not already said, and at the same time avoid letting the students know that I had overdrawn my account." "Is that why you bombarded us with two lectures on 'Epochs in Dentistry?'" "Just so." More work and less talk would come nearer meeting the average student's requirements.

BOOKS, PAMPHLETS, ETC.

IRREGULARITIES OF THE TEETH AND THEIR TREATMENT. By Eugene S. Talbot, M. D., D. D. S., with 152 illustrations. Philadelphia: P. Blackiston, Son & Co. Pp. 163.

In this little work Dr. Talbot has well said and fully illustrated nearly everything of practical value that the student or busy practitioner is likely to inquire about, or put to effective use.

Under the general heading of "Anatomy" are discussed the maxillæ, occlusion of the teeth, etiology of irregularities, irregularities acquired, inherited, and caused by the too early extraction of the temporary teeth; while under "Treatment" are considered at length the proper period for regulating, impressions, models, mechanical forces, different methods, special forms of irregularities, protruding teeth, etc.

Some fault has been found with the author for sundry omissions, both of method and credit; but these are not of vital importance to any one, and may be easily and fairly dealt with in another and later edition. In presenting the profession with an excellent account of irregularities of the teeth and their treatment, Dr. Talbot has escaped the production of a cyclopædia, wherefore both author and profession are to be congratulated.

As to style, paper, binding, and other things that go to make a book presentable, the publishers have done, as is their custom, excellently well.

DENTAL REGISTER. Fourth edition, revised and improved. Rochester: Geo. P. Davis.

New outline cuts have been introduced and the ruling and paging are such that the book may be used as register, daybook and ledger. Price according to binding and number of pages. Send for specimen page.

Books, phamphlets, periodicals, exchanges, etc., should be addresed direct to J. Edw. Line, 26 East Main Street.

THE

Odontographic Journal.

VOLUME IX.—*July, 1888.*—*No. 2.*

PRESIDENT'S ANNUAL ADDRESS.

BY NORMAN W. KINGSLEY, D. D. S., M. D. S., New York.

If it were not that the code of this Society makes it imperative that the President deliver an Address, you would not find me voluntarily imposing myself upon you.

Addresses by Presidents of Societies are usually prepared and delivered in such a perfunctory manner that I regard the custom as more honored in the breach than in the observance.

It gives me pleasure to announce that important amendments to the Law regulating the practice of dentistry in this State have been made by the Legislature now in session, and the Act is in the hands of the Governor for his signature.* The character of these amendments, their bearing upon our profession in this State, and a history of this successful application to the Legislature are embodied in a report to be made by the Committee on Dental Law.

It is not my province to anticipate that report, but it is my duty to inform you that this valuable addition to our legal strength has been wrought by the unaided efforts of one man. To one man only are we indebted for all the time, labor and anxiety, all the energy, perseverance and diplomacy which have accomplished this result. When this Society makes up its roll of honor, the name of the Chairman of the Committee on Dental Law will stand second to none. I shall leave it to the promptings of your generosity to show by something more substantial than mere words your appreciation of his untiring efforts.

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* The Act was signed by the Governor before the meeting adjourned.

The Board of Censors reports that six applicants have successfully passed their examination and are recommended for the degree of M. D. S. This makes the total number of those who have secured this degree 105, that is at the rate of 5 per annum for the twenty years of our existence—surely not an excessive number.

There are some reflections upon this statement that it is well enough for the society to consider. The examinations of that board since the first year of its organization have been more thorough and more searching than the examinations of any other board or faculty of dentist examiners in the world. This is not said in any boastful way; it is an established fact. Every one who has gone through the ordeal can testify to the truth of this statement, and it is those who have been examined by other boards who most fully appreciate the degree here acquired. Every member of the board now, as well as all who preceded them, is and was actuated only by a conscientious fidelity to duty. They have discharged that duty in a manner which entitles them to our everlasting gratitude. Year after year they have spent their time and money to serve you; and when I say that they are entitled to your gratitude, that is the least you can do. You have taken their services, and except for a short time in the earlier period, you have returned them naught. This Society has received for their work more than $2,000, that is $2,000 taken without equivalent to the men who have discharged this delicate responsibility. Would any individual among you so treat a common servant?

If I should confine this address strictly to the requirements of the Code, it could be dismissed in a few words, but as such an act would be wanting in courtesy, I shall be pardoned for taking up some topics of general rather than merely local interest.

Twenty years ago, on the seventh of April, the dental profession of the State of New York came of age. At that date it was for the first time invested with legal authority to manage its own affairs. During all its previous history it might have been likened to a collection of inexperienced youths who could not be trusted with their own interests; who were incapable of self-government, and who could not be permitted to become citizens until they had reached the age of discretion.

Forty-five years ago, the American Society of Dental Surgeons recognized the necessity for some authoritative discrimination between the honorable and skillful practitioner and the charlatan nd quack, and instructed a Committee (if in its judgment ita was deemed feasible) to apply to the Legislature of the State of New York to legalize a State Society and empower it to do this work. That Committee reported at a subsequent meeting that in its opinion the time had not arrived when such action would be judicious or expedient.

The reasons were, in brief, that the efficient working of the Law by the Societies created under it would depend upon the action of a majority; if that majority were composed of men of intelligence and high aims the law would be safe and salutary, but if the opposite state occur, the law might "become a powerful agent for evil, by conferring upon unworthy men a dignity and power which their own merits could never command." "It would not only enable them to propagate their own species; but what would be far worse, they would go forth under the sanction of law."

This feeling had not died out when, twenty-five years later, a convention was called to meet in Utica to consider the same subject. The honored first president of this Society had not entirely subdued his fears that the fullness of time had not then come, and he and his colleagues entered upon their work with many misgivings. But they builded wiser than they knew; a liberal Legislature granted the Charter, and the Dental profession of the State of New York passed immediately from childhood to manhood.

The birth of dentistry was coeval with the birth of the present century. It was at that time men first began to follow it as a vocation. Previous to that time dentistry was an avocation; an adjunct to the trade of the barber and the quack doctor. The first twenty years of our professional existence was an infancy which bore about the same relation to the last twenty years, as the toddling babe to the robust athlete. When we consider the narrow limit of the dental practice of that day—so limited that a hand book carried in one pocket would contain the whole sum of dental knowledge, while another pocket could carry all the instruments necessary to put that knowledge in practice—and contrast it with the libraries and office outfits of to-day, we realize that dentistry was indeed in its infancy.

In Shakespeare's Seven Ages of Man, the first stage is that of the infant in the nurse's arms, and the fourth that of "the Soldier, full of strange oaths and bearded like the pard." We are now in the fourth period of twenty years since the birth of our profession; and if we do not show *all* the characteristics of Shakepeare's creation, we have nevertheless all the vigor, the courage and some of the aggressiveness that blustering blasphemer.

We have half a hundred local societies in this country, made up of men who have the courage of their convictions, and whose frequent contact with each other tends to develop character as no other experience can. There is no other profession which can show so much antagonism without bitterness as is seen frequently in meetings of dentists.

In this society we have shown that the fears of our founders have not been realized. To us was intrusted a delicate and responsible charge. The law of the State gave us power for evil or good, according as it might be administered ; we have been favored with steady brains and wise counsels. The provisions of the law have been carried out with firmness, with leniency, and with justice. We have avoided one extreme, into which we might readily have been led, that of dealing with violators with such harshness as to provoke the legislature to repeal our Charter. Even a less wise body than our Board of Censors might easily have created an antagonism between itself and the dental colleges which would have been detrimental to both. With the power of that Board in the hands of unscrupulous men, incalcuable damage would have been done to our good name.

The year which ends to-day has been prosperous. The State Society has prospered, the district Societies have prospered, and individual members have prospered. Dentistry, as a profession, has advanced scientifically, practically, and socially. Dentists have a better standing in the community to-day than they had a year ago. The advance in this respect may not be perceptible in individual cases, nor may it appear in any marked degree in the mass, but it is a progress that every decade shows, and with the forces now at work is sure to continue. The principal factor in this social recognition is the driving out, through the efforts of this Society, of a horde of incompetents, leaving the field to men of better education and to more honest, faithful effort.

There has been within the last year another alleged recognition which has acted upon some men like the inhalation of a small volume of gas. It has puffed them up with vain conceits, and while it lasted, they really believed themselves of more importance than before they inhaled the recognition. The gas has evaporated, the exaltation is gone, but it has left the supreme satisfaction that for one short hour they were recognized.

I recently put to a dentist of long experience and observation this query: "What topic is of the most vital interest to the dental profession to-day?" His immediate answer was "Education." I pondered upon the reply. It had a hackneyed sound. If it be the most vital topic it certainly lacks freshness, for in every society which I have ever attended this has been the one question that sooner or later "bobbed up serenely," and upon which all were agreed; that education was a good thing. In a Society, some years ago, I discovered that one speaker's idea of education was confined to teaching the masses to come oftener to the dentist and pay him larger bills. Education in the minds of other dentists is that which they think their competitors need: as for themselves they get along very well. But that which my friend had in mind was the problem that has puzzled many of us and which the ideal dental college alone will solve.

I was young enough, and ambitious enough once to conceive that ideal dental college, and endeavored to build it. I fondly believed that such an institution could be so organized and conducted, that only selected material would be allowed to enter, that its curriculum should embrace so much of all the sciences as it was necessary for a dentist to know, and that when the student graduated, his diploma should be a passport to distinction in his profession the world over; that the mere fact that he had attained to the distinction of that diploma would be instantly recognized as proof of superior ability. But my dreams came to an end, for dreams of the future they were. I was in advance of my generation. The majority of the trustees of that institution, after a three years trial, could see no reason why that college should attempt anything more than other dental colleges; "it wouldn't pay," and immediately it sunk to the level of the common-place, and there it remains.

The inherent defect in all institutions for the education of dentists is that they must be made to pay. Teachers will devote their best powers, for a short period, for individual honor and the glory of the cause, but this being satisfied, they are human enough thereafter to want the equivalent for their services in cold cash. No institution for making dentists will reach the highest ideal until the financial aspect is entirely eliminated from the professors' calculations. When some benevolent billionaire endows a dental college, and assures fully paid salaries to the most competent teachers, then and only then, shall we cease to be interested and anxious about dental education.

To another acquaintance I put the question : "What subject is of the most vital interest to dentists to-day ?" and his answer was "the domination of the dealers in dental materials over our profession." I asked him "How ?"

He answered me, "They run our periodical literature, they admit nothing into their columns which conflicts with, or would tend to restrict, the sale of their own manufactures. They form combinations antagonistic to our interests, by which competition is broken down and small dealers are forced into the "Trust," lest their wares be boycotted. Valuable inventions of dentists are shelved and smothered, because the inventor, not having capital, must seek the manufacturer, and the invention that might prove of incalcuable value in practice is wrung out of the inventors' necessities and buried ; or the more villainous practice resorted to of stealing it, so that the impecunious inventor must waste his little substance in seeking redress in the courts. Again, inventors have been denied an exhibition of their inventions at public clinics because it might interfere with the sale of articles already manufactured, designed for the same use, and Societies have even refused the exhibition of goods other than those of the favored manufacturer. And yet we boast of being an independent profession ! Independent of what ?" To this scathing indictment I made no other reply than the words of a celebrated criminal, "What are you going to do about it ?"

To still another dentist I repeated my query as to the topic of most vital interest, and his reply was, "Shall we retain our independence as a profession, or shall we merge ourselves in the organizations of another ?" And I answered him, "Are we not already merged ?" Was not the seventeenth part of an organization offered us, did we not go there in hordes, and did not each one who had no degree, confer upon himself the title of doctor, write it before his name, and immediately become a member of the medical profession ?"

But I am only met with a smile of cynical incredulity as my friend goes on to say that I "must be simple minded not to see that immediately on the adjournment of the great Congress we relasped into mere dentists, that we were only medical men *pro tem*, just long enough to be counted in the aggregate and to collect our ducats." "Don't you know," said he, "that the ones who appreciated that precious privilege the most, belong to the very class, that in this State, we are trying to drive beyond our borders : that we would not permit them to become members of this society? But they can become medical men by the stroke of a pen and then find rest in the bosom of their mother."

"As a scientific meeting of dentists, that gathering was inferior to some of the meetings of mere local societies. It has adjourned and passed away with only a ripple left to tell where it was, and to-day the status of dentistry is unchanged. We are as we were before, interested only in our own organizations, in which we can be vastly more effective."

Let me continue this topic by saying that the agitation of this subject points unmistakably to the formation sooner or later of an International Dental Congress. There is now an effort to create an opposition to such a Congress by trying to make it appear that it would be the rival of, or the antagonist of a Medical Congress. Such a view is forced and out of all reason. There is no more conflict between them than there is to-day in this country between the American Medical Association, with its section of dental surgery, and the American Dental Association, which is made up exclusively of dentists. Neither interferes in the slightest degree with the freedom or usefulness of the other.

It is folly to suppose that that section in the American Medical Association is going to supplant our American Dental Association ; the temper of the dental profession will not permit it. It is equally folly to suppose that a section of a Medical Congress is going to satisfy the desire for an International Dental Congress. Organizations of dentists are too firmly fixed to be broken up and disbanded by merging in other organizations. Even if the future develop a tendency in that direction, it must be a later generation which will take kindly to the change.

Sooner or later it is the duty of the dentists of the State of New York to take action on this matter, or throw away the prestige they now rightfully hold. The Empire State has a larger number of dentists within its borders than any like area elsewhere. It has a larger number of world renowned men. It has more and better local organizations and an unrivaled *esprit de corps*. Some of its local societies have contributed more to the scientific advancement of dentistry than any other society in existence. This State was the first to adopt and successfully put in operation a law regulating the practice of dentistry; and this State has to-day the best and strongest law that exists. It was in this State that the idea of an International Dental Congress was first conceived and publicly announced.

The eternal fitness of things points to this State as the place of all others for an International Congress, which shall be the first of a series likely to continue when we and our acts of to-day have been forgotten. Every sentiment of patriotic devotion to our profession urges us to stand by the organizations which we have spent a lifetime in building and maintaining. What we have achieved we have done in the face of obstacles to which a less courageous and persistent body of men would have succumbed. We are respected because we command respect, we shall command it still more by showing to the world that we are not ready to throw away lightly that which has cost us so much in acquiring.

The antagonism to a Dental Congress looks unmistakably to the ultimate abandonment of all distinctly dental organizations and merging them in sections of medical organizations. Nothing could be more fatal to the two world renowned Societies in New York City—the Odontological Society and the First District Society, than to sink them into a section of the County Medical Society. Nothing would sap the vitality of the Dental Society of the State of New York so quickly and so thoroughly as to reduce it to a section of the State Medical Association.

Of this State Society and its work I am proud. I am proud of being, by your suffrages, its president. I am proud of you, my fellow workers of twenty years; and when I leave this chair, not to return again, let this my message, borrowed from another, ring in your ears. "STAND BY YOUR GUNS BOYS."

WHAT LACK I YET?

BY W. H. ATKINSON, M. D., D. D. S., New York.

[Read before the Dental Society of the State of New York.]

This was the query of a well educated and honest young man of the great Teacher we have been commended to as the type of intelligence, purity and beneficence. "Go sell all that thou hast and give to the poor, and come and follow me and thou shalt have treasure in heaven," was the answer He gave him. The young man at the hearing of that saying went away sorrowful, "for he was very rich" in the things he had been taught to value above all else, viz.: earthly treasure. What was the "lack" of this specially correct young man? Doubtless it was lack of breadth of knowledge and grasp of foundation principle. He had kept the commandments, paid tithes and fulfilled the outward requirements of the law, which so far as it goes is commendable; but he had failed to see that wisdom and knowledge do not belong to the individual but are the common inheritance of all who are in need thereof for the guidance and direction and who feel the need of instruction. But to those who feel that they are full and lack nothing worthy of being desired by them, have no need for further preparation and therefore consider their studies at an end, and their ability to meet the demands of duty complete. This has grown out of didactic, rather than demonstrative methods of teaching in which a repetition of memorized sentences passed for evidence of qualification, upon which diplomas are granted to those who comprehended not the doctrines involved in the words of the didactic teachers, thus perpretrating a fraud upon pupils and the public they are to serve, no less than bringing manifold sorrows to patient, pupil and those who taught them.

The great lack is the want of courage to obey the dictates of personal conscience rather than the behests of fashionable domination of reigning error as the arbiter of the the thing to do, which grows out of the assumption of authority as absolute on the part of accepted teachers; and shuts the door to improvements in, not only modes of expression, but also better methods of mentally struggling with foundation principles and functional activities of mind and body. We are liable to take sides and argue instead of searching for knowledge of principles and practices. As we are not yet complete in knowledge we should be more courteous to our fellows and give them the like liberty and hearing which we desire for our own views and practices. How often do we hear criticisms of practitioners made from the statement of patients without due consideration of the one-sidedness and looseness involved.

Most of us lack the knowledge which would lead us to be patient and forbearing towards patients who assume to be able to "size us up," so as to entitle them to *direct* us just what to do for them, and to closely scrutinize each little step which they suppose to interfere with what they regard as correct practice. Many are of the belief that the enamel is an exceedingly thin stratum on the surface of the tooth, and any loss of it will expose dentine to inevitable decay.

Very young and very old practioners are likely to resent this sort of dictation in a brusk if not unkind spirit, thus leading to antagonism between patient and practitioner, which is easily avoided if we put a check rein on our personal dignity and dispassionately instruct the patient in the principles involved, in such a manner as to convince them mildly that we are master of the situation.

A genuine courtsey instead of the commercial, artificial, outside and fashionable, regulation style of the article, is a very great lack among dentists as exemplified in the conduct of those who give and of those who need counsel in special cases. Some who send patients to others for special exercise of skill have found the specialist to transcend the limit intended by taking the whole charge with the assumption of superiority in *all* departments, and insinuating that the entire control by *one* is best for the patient.

It requires intellegence and probity to so conduct the management of such instances as not to be laid open to the charge of lack of courtesy on the part of those desiring counsel, and of those desiring to afford the same so as to attain the highest good to all parties concerned. It is probably not because of any special wickedness on the part of those who undertake doubtful cases until they can go no farther without counsel, more than it is in the called counsellor to transcend the limit of investigation and advice. In fact we have no means of didactically instructing learners by which they may be qualified to comprehend the limit of their attainment so as to induce them to call counsel before undertaking difficult cases. The only adequate method of soundly instructing pupils and practitioners is through the medium of clinically conducting the management of simple, ordinary or extraordinary departures from normal condition by pooling the strength of the teacher and pupil in clinical management of all varieties of deformity or disease for which we, as dentists, are consulted.

All that is necessary to substantiate this statement is to take a survey of the rise and progress dentistry has already made.

In this review it will be readily seen how common it is for old practitioners to assume that their time of service must have acquainted them with the profoundest knowledge, and best exercise of skill. The assumption on their part renders them liable to undervalue the knowledge, sharpness and facility with which the new graduate holds himself as being endowed, thus discouraging the fresher understanding and methods of the fledgling and unduly underestimating them, instead of patiently affording them an adequate hearing. The great difference between thirty years ago and to-day has grown out of the association of all sorts of dentists in open discussion and clinical demonstration by reason of the forming of societies before which these may be had all over the country, and yet we have successful practitioners who hold themselves aloof from associations, and brilliant graduates who fail to appreciate the best practices simply because of their exclusiveness.

In closing I deem worth repeating what was said through me when considering the subject of association among dentists long since. The desire that springs spontaneously in the heart for association is dried and killed out the moment we begin to calculate what it will cost. Be assured, the greatest lack of the profession, after breadth, is want of earnest, frequent communion ; and the time has come when we cannot afford, even in a pecuniary sense, to ignore association. For, as where the most fuel is, the fire is hottest, so where the atmosphere is redolent of truths and of facts, principles and methods, the most rapid and least expensive advancement will be. Then let us come together in the spirit of true fraternity and feel, one after another our lacks, that we may finally stand disenthralled and fully enfranchised with all that truly constitutes the professional, christian gentleman.

Had we one single leader who filled the measure, and devoted himself to the elevation of our standard, regarding that work as a mission committed to him that he dared not neglect, more would be done to advance the profession in the next half decade than has been done in all the past.

This may seem like hyperbole to some, but it is sober truth, and will be demonstrated to the most obtuse when the conditions are fulfilled. Who, among us all, that has tasted the sapid contact of open, free fraternal association in our conventions and more regular gatherings, but has resolved at that time, to make it a point to be more prompt in their support in the future ?

But alas ! "Like the sow that was washed," we too often drop in the mire of isolation on our return to the field of our daily labor.

I do not say *all* who ever enjoyed contact in our gatherings thus resolve, but I do say, all who are *alive* and worthy to enjoy such opportunity repeated do make, honestly just such a resolve. Circumstances may control us for a time ; but if we are in real professional, christian, or human earnestness we will make circumstances in turn come under our control, and minister to our joy and profit every way. Here, as elsewhere, he who his solicitous to save his life

(time and money) shall lose it ;" while he who is willing to trust God or noble humanity, even if he should lose part of his time, money, or life, will the more certainly "find it." Having freely received of the arduous labors of others, it is imperative that we freely give (not sell) to others of our labors. Lack of ability or willingness to communicate what we know, is a heavy incubus on the profession.

I often *feel* that an earnest spilling over of our best and choicest items is but two nearly allied to casting pearls to swine ; yet one advantage it always possesses, i. e., the disposition and ability to communicate are both increased by the practice, even at the hazard named. Lack of habit of communicating, or want of " keeping the hand in" is also a fruitful source of failure in otherwise competent and efficient workers.

If we have new cases in abundance, we need not recapitulate in the labratory the cases of our pupilage and daily toil ; for in those new cases we have the double stimulus of *doing* good to *others* as well as receiving good. In like manner we should review our studies, text-books and old journals, in the lack of new matters, on which to appease our mental appetites. It is, depend on it, a possible thing to forget ; the hand may forget its cunning, and the heart may forget its interest in the multifarious exercises of life ; hence the necessity of a surety of the past to show us certainly where we stand now, that we may be stimulated to proper excellence in the work of "head, heart and hand." It was once queried "Thou that teachest a man should not steal, dost thou steal ?"

We all acknowledge the rectitude of principles ; let us see to it that we also respect the rectitude of correct practices, by coming out of our puerility and self-hood in these, as fast as we may. Earnest preparation, close examination, faithful execution, cleansing and purifying ourselves by severe recapitulation at each period, repeated throughout our career, will insure proximate completeness to every one honestly exercised thereby.

DENTAL LAW IN THIS STATE.

BY WM. CARR, M. D., NEW YORK, CHAIRMAN OF THE COMMITTEE.

[Reported to the N. Y. State Society in May, '88.]

Since our last meeting, sixteen cases of alleged illegal practice have been reported from different parts of the State. These were investigated with the following results :

The first case was that of a young man who had attended two full courses of lectures in the New York College of Dentistry. He did not present himself for examination before the faculty of this college, but obtained a diploma from the Delavan Dental College, registered under this diploma in the County of New York, and is now practicing in the City of New York.

In nine (9) cases, which were reported, it was ascertained that they were all registered under the Law of 1879, but not in the counties in which they are now located.

Four were reported who claimed to be practicing only as assistants to qualified dentists, therefore not amenable to the law.

Two acknowledged that they had no legal right to practice, closed their offices and disappeared.

Seven applications to practice were made to the Chairman by foreign licentiates ; of these, five were from Germany and two from England. Upon being informed that they were not entitled to practice in this State, as the laws did not recognized their credentials, they went into other States to practice.

While the Committee kept a record of these cases, no legal action was taken, as the Committee, under instructions from the State Society at its last meeting, proposed to present to the Legistature an amendment which would cover the defects in the dental law of 1879, and it was not deemed advisable to draw public attention to this law lest we should fail to secure the desired amendment. The Committee did not rely entirely upon its own judgment in drawing this amendment, but submitted it to eminent legal authority in order to ascertain whether it would render the law thoroughly effective. This assurance being given, the amendment was placed in the hands of Hon. Robert Ray Hamilton, of New York City, who consented to present it to the Legislature, and who promised to do everything within his power to secure its passage. This promise he faithfully kept. Upon being introduced into the Assembly the bill was referred to the Judiciary Committee, when we ascertained that Hon. John E. Savery, a practicing dentist of Auburn, had also drawn an amendment to the dental law which he intended to present to the Legislature. He requested that our bill should be held in Committee until he could communicate with the Chairman of your Committe. Upon being notified of this request by Mr. Hamilton, the Chairman went to Albany and had an interview with Dr. Savery, and found him keenly alive to the necessity of more stringent legislation in regard to the practice of dentistry. His bill differed slightly from ours, but, in the interest of the profession, he generously withdrew it and consented to work in behalf of the bill presented by your Committee. We heartily appreciate the services rendered by Dr. Savery in laboring so earnestly for its passage through both the Assembly and Senate.

The Committee had previously sent several hundred circular letters to representative dentists throughout the State, urging the necessity of each having an interview with the Member of Assembly and Senator representing his district, and requesting them to endeavor to secure the speedy passage of the bill. The result of these combined efforts became apparent when, notwithstanding a few drawbacks, the bill passed the Assembly with only two adverse votes in eighty-four, while it passed the Senate unamiously. It is now in the hands of the Governor for signature.

In order to clearly understand the changes made in the Law of 1878, I will read Sections 1, and 3, together with their respective amendments.

> "SECTION 1. It shall be unlawful for any person to practice dentistry in the State of New York, for fee or reward, unless he shall have received a proper diploma, or certificate of qualification from the State Dental Society, or from the faculty of a reputable dental or medical college recognized as such by said Society; provided that nothing in this section shall apply to persons now engaged in the practice of dentistry in the State of New York."

By this Section any legally qualified dentist could open as many offices as he desired throughout the State and employ unqualified men to superintend them, provided they were conducted under the name of the qualified dentist. These superintendents, or assistants, as they are termed, were not amenable to the law. To obivate this difficulty, Section 1 was amended to read as follows:

> "SECTION 1. It shall be unlawful for any person to practice dentistry in the State of New York for fee or reward, or to assist in the practice of dentistry as either agent or employe, unless he shall have received a proper diploma or certificate of qualification from the State Dental Society or from the faculty of a reputable dental or medical college, recognized as such by said Society, and shall be duly registered and shall have received a certificate thereof, as provided in Section 3 of this Act; provided that persons who were engaged in the practice of dentistry in the State of New York, on the twentieth day of June, eighteen hundred and seventy-nine, who shall comply with the requirements of Section 3 of this Act, shall be otherwise exempt from the provisions of this Section, and provided further that nothing contained in this Section shall prevent a student who is pursuring a regular course of intruction from assisting a person in the practice of dentistry qualified as herein before provided.

Section 3 of the Law of 1879 read as follows:

> "SECTION 3. Every person practicing dentistry within this State shall, within sixty days after the passage of this Act, register in the office of the clerk of the County, where located, in a book to be prepared and kept by the clerk for that purpose, giving his name, office and post office address, and the date of such registration upon payment to the clerk of a fee of fifty cents."

By this Section, registration was compulsory *only* for those who were practicing dentistry on June 20, 1879. No provision for registration being made for the steadily increasing number of practitioners.

Also no provision was made for re-registration in case practitioners removed from one County into another.

Further, County clerks had no instruction relative to the diplomas presented: Therefore, upon application, they registered the possessor of any diploma whether or not such diploma was recognized by the State Dental Society.

Section 3, amended, reads as follows:

> "SECTION 3. Every person practicing dentistry within this State shall register in the office of the clerk of the County where his place of business is located, and in the office of the clerk of any County into which he shall remove his place of business, in a book to be prepared and kept by the clerk for that purpose giving his name, office and post office address and the date of such registration, and shall, on presenting to the County clerk a certificate from the member of the State Board of Censors appointed by the State Dental Society for the judicial district in which such County is situated, that he has received a proper diploma or certificate of qualification as provided in Section 1 of this Act, be entitled to register and to receive a certificate of such registration upon payment to the County clerk of a fee of fifty cents.

To recapitulate briefly:

1st. Under the amended law it is obligatory upon every person practicing dentistry in this State to be duly registered.

2d. All persons assisting in operative dentistry, either as agent or employe, must have received a proper diploma and must be registered.

3d. A practitioner removing from one County to another must re-register in the County into which he removes.

4th. Before registration, every diploma must be endorsed by the State Censor representing the County in which the applicant for registration is located.

Your Committee is convinced that, under the existing law, it will be impossible for any person to practice dentistry in this State without being properly qualified, and further, the Committee hopes to be enabled at the next annual meeting of this Society to report that the State is entirely free from illegal practitioners.

THE LAW OF CURE.

BY B. A. R. OTTOLENGUI, M. D. S., New York.

[From Paper read before the Dental Society of the State of New York.]

In disease we have simply an alteration of the normal condition of the matter through which the plastic power is working to produce the highest perfection, which when found we denominate health. As soon as disturbance occurs the plastic power attempts to harmonize, and restore. We have seen that this power is limited, therefore under certain conditions it cannot succeed in reproducing normal action. Failing so to do it next attempts to so arrange that the new and irritating condition may be supported by the remainder of the body. Again is it limited, and if it fails the result must be death of the individual.

In brief this is the law of cure.

All that remains of my task is to show how the various systems I have described operate under this law.

Allopathy and homeopathy I may consider together, as, though in many respects dissimilar, they are on common ground in as much as they depend largely on drugs. Drugs may be classed as active and passive. Active drugs are those which form a chemical union in the system with other matters there existing before exhibition ; it is in this way that they effect a cure if at all. A diseased condition is a destruction of tissue, and the plastic power is attempting to repair the damage. If it fail to do so, the patient must be the continual sufferer or die. The failure may be due to some matter present which the plastic power cannot control. If now an active drug be given which, on being brought in contact with this disturbing matter, is chemically united to it forming a third body, this body may be one over which the plastic power has full control, and at once there is relief and normal action. This is what always occurs when to counteract a poison we give an antidote. The second class are the passive drugs. These are they which do not effect a chemical union with matters already in the body. This being so they act as foreign bodies, and as such cannot be tolerated, but must be cast out. In the case of some chronic disease, one which the plastic power having failed to rid the body of has ceased to actively attack, the presence of such a passive drug occasioning the necessity for its expulsion may excite a renewed effort, and perhaps under the new conditions effect a cure.

The hydropath has undoubtedly studied the activity of the plastic power, and based the whole system of his treatment on the results of this observation. He has attempted to discover just how this invisible agent rids the system of matters not nutritious, and therefore deleterious and injurious, and in his attempt to aid the power, he operates on what he deems the same general plan. First, he ceases to supply injurious matters; and second, he seeks to free the body of those already present. In thus purifying itself he finds that the vehicle used in all the excreting organs is water; in fact that more than three-quarters of the whole body is water, and so he has given his faith to that agent, coupled with general hygiene, and it must be admitted, with noteworthy success.

Nichols, the hydropath I have already quoted, shows his working to be copied after this plastic power; for he says "I believe that every organized being whether vegetable, animal or man, is pervaded by a spiritual principal which acts upon matter, holds it to its own form, and controls the whole phenomena of organic life, consciousness, passion and intelligence."

I have spoken of the law, and the agent who operates the law, but thus far I have refrained from any allusion to the intelligence which framed the law. This is where the phrenopath or Christain scientist bids you look and pin your faith. Whilst he asks you to beg for health at the throne of King of kings, he also points out that it will reach you only through the limitations of the law as it may be recognized by effects. There are no cures effected by this system which are in anyway at variance with this law and the operation of a power. Much may be gained by a medical practitioner by the study of this philosophy of cure. Take the one item of thought transference. Even though the practitioner may scout at it as the emanation of a mind bemuddled, let him but try it, and constantly charge his mind whilst operating, first with the belief that his patient will recover, and second with the honest hope that he may do so, and there is little doubt that the sphere of that man's usefulness will be increased. I cannot refrain from saying, however, before leaving this subject, that there is great danger in Christian science. It is not new. I have not space to demonstrate it, but it can be undeniably shown that this is a continuance of the doctrines of the Brahmins. All that the Chistian scientist claims in the possible absolute control of the body by the mind is in the philosophy alluded to. Only select men were allowed to be initiated into the study of this occult philosophy, however, and it is admitted that a large number of these men became insane. It is so also with those who attempt to master this later day science. There is not an asylum in this State which has not one or more inmates sent there through Christian science, or rather through a failure to master a comprehension of this most profound philosophy. If you value the happiness of your homes, keep the literature and the knowledge of this study from those in your family who have not gifted mental capacity. This is specially aimed at your women. The profession has recently lost a bright member from this cause.

As to animal magnetism I have only to say that it aims directly at obeying the law, since it merely means to supply additional energy to the power which cures or restores. It operates in an intelligent manner. It first produces sleep. There is abundant evidence to prove that repair goes on mainly during sleep. Whilst the organism is active it is using up material, when it rests it renews the tissues. The plastic power must possess the attributes of attraction and repulsion. This being so let one one who possesses this energy in superabundance direct it towards one who needs it, and the result is that by attraction it passes from him to his patient, just so long as there is an unequal distribution. This is evidenced by the oft reported fact that one who may be readily magnetized when sick, and therefore deficient in vitality, ceases to be sensitive to such magnetic influence as soon as restored to health.

A few words in regard to the use this may be to dentists. The medical fraternity are bound by sentiment or prejudice to the doctrines inculcated in their *AlmaMater.* Let the dentist acknowledge no such allegience, but practice in the broad school of humanity which teaches us to do good by whatever means are proven potential. I have found both allopathic and homeopathic nostrums servicable. As an instance of hydropathy I can report that a wet sheet pack, if you can persuade your patient, or otherwise a Russian bath, will do very much to relieve pericementitis, one of the most troublesome ailments which come to us. I have cured the most terrific paroxysms of earache, headache and toothache, by a few magnetic passes, and my success in phrenopathic treatment has already been reported.

In conclusion let me state that I claim no originality for this paper beyond the intention of attracting attention to the fact that there is good in other systems besides ours, and that all operate under a common law. Where I have quoted absolutely I have accredited it. But I must further acknowledge my indebtedness to the works of Dr.

Hack Tuck, whose work I recommend to all as preferable to any other on phrenopathic phenomena ; to Drs. Geo. Moore, T. L. Nichols, Frederick T. Parsons, J. D. Neuman, to Deluze, Rauch, Jaccotliott, Sinnett, Evans, etc.

Knowledge though an abstract thing, follows the laws of living beings as to perpetuation. The man is born, lives and dies, but through his seed arises another man, who must begin as he did and learn from the beginning. If it were not for books, knowledge would still advance by being handed down from mouth to mouth. But since printing allows us books, these become seeds of knowledge, and mark the progress that science has made. The mind of man is the soil in which this seed of knowledge must be planted that it may bear fruit, and in turn more seed, and following the law of evolution keep on advancing till the highest attainment is mastered. Then there will be no esoteric laws, for all will be known. In this paper which I offer you I have simply gathered up some of the seed which it has seemed to me should be planted, and in the minds of my hearers I know I have the most fertile soil. May the harvest be a glorious advance towards the great goal.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

TWENTIETH ANNUAL MEETING.

REPORTED BJONES DE SMITH, D. D. S.

The Society met at Albany, May 9th and 10th, holding four sessions. The President, Dr. Kingsley, called members to order.

The roll was called by the Secretary, members and delegates responded as follows :

PERMANENT MEMBERS.—Doctors Ames, Atkinson, Barnes, Baxter, Brockway, Carr, Colgrove, Colton, Cook, Curtis, Elmendorf, French, (F.,) French, (S.D.,) Geran, Greene, Gross, Harreys, Holmes, Howard, Ives, Jarvie, Jewell, Kingsley, Lamb, Line, Mills, Mirick, Nash, Palmer, Pitts, Priest, Race, Rathbun, Sloan, Southwick, Stacks, Van Vleck, Van Woert, Walker, Weed, Welch, Wheeler, Wright.

DELEGATE MEMBERS.—Doctors Brown, Curtis, Dailey, Dickey, Doolittle, Emerson, Garvey, Greene, Gross, Hart, Holley, Howard, Ives, Jewell, Nelson, Rhein, Rich, (A. C.,) Rich, (C. F.,) Ritter, Rosa, Scott, Tibbits, Van Woert, Verplanck, Walker, Weed, Whitbeck, Young.

The Secretary read the minutes of the last session of the meeting of 1887, those of the three preceeding sessions having been read by the stenographer at that meeting. They were approved as read.

Dr. Baxter reported the following delegates certificates: 1st, Dr. Ottolengui; 2nd, Drs. Dickey, Mills and Latson; 3rd, Drs. Canaday and Young; 4th, Dr. Doolittle; 5th, Drs. Ritter, Jones and MacDongal; 6th, Drs. Fish and Hoysradt; 7th, Drs. Elmendorf, White and Cowan; 8th, Dr. Phillips.

Ten minutes were given members to pay dues.

President Kingsley delivered the Annual Address. (See page 73.)

Dr. Mirick's report showed a balance on hand of $1,259.96.

Dr. Atkinson, the correspondent, said he hadn't written a report for the reason that his advice, persistently repeated since his election years before as correspondent, hadn't been heeded. He was without answer from a single member of the profession upon the questions in the circulars distributed. He utterly refused to worry himself any further with the Society's correspondence. It pained him more than he could tell, to think that the estimate he had placed upon members with such maternal regard had failed him. He had begotten and raised up children, in more senses than one, who had rebelled against him, not personally, but in the conception of what, in his mind, was the highest conception of their duty. If he were the only individual upon this planet it would have been different, or if others present were; but we were legion. We were what we were, as in the utterances of our president, which should be printed in letters of gold and scattered where diseased teeth have made dentistry a necessity, and we should stand as an organized, coherent body, in the purpose to sustain the confidence of all that makes us a profession. "Talk of our being a 'branch of a profession;' we are the tip-top of all professions."

The Board of Censors, through Secretary French, recommended the following for the "M. D. S.:" J. W. Cowan, Geneseo; Fred J. Capon, Toronto, (D. D. S., and L. D. S., respectively;) P. S. Garvey, Hudson; Chas. F. Howell, Rochester; G. E. Rice, New York; A. J. Burns, Fairport.

The Board also recommended as beneficiaries: To New York College of Dentistry, Geo. E. Rice, New York; to Baltimore College of Dental Surgery, Henry D. Hatch, Albion.

Dr. W. A. White had informed the Board that the University of Maryland would be pleased to receive a beneficiary from this Society, and the Board recommended Wm. R. Mills, Lyons.

Dr. Ives, of the Committee on Ethics, was made to say that he had been unable to find any ethics during the last year ; hadn't looked very dilligently, perhaps.

Dr. Walker reported the following programme :

Annual address by Dr. Kingsley, papers by Drs. Shephard, Carr, Atkinson, Ottolengui, and Southwich, and clinics Drs. Spencer, Rhein, Brown and Parr.

Dr. Brockway, of the Committee on prize Essays, quoted the chapter on Snakes, from the History of Ireland, and reported that there were no Essays.

President Kingsley suggested that it might be proper to abandon the prize essay business, as it seemed to have fallen into "innocuous desuetude ;" but perhaps it might be well to keep it up a little longer and, as the committee had said, "look for a better crop next year."

Committee on Dental Law, presented the report. (On page 84.)

Dr. Carr said that when this bill had been presented to the Legislature, a copy had also been presented to a member of the Supreme Court with the request that he look it over, which he had done. The verdict was—"The law is clear and the State Society has the right to decide, and is the only judge to decide, upon the standing of the colleges."

Questioning by members elicited the fact that a man who had registered in '79, or legally since that year, need not re-register, except on removal to another county, and in that case he must register in that county, even if he had registered forty times elsewhere.

Dr. Jarvie's motion that the committee be given a vote of thanks was carried by a rising vote.

Dr. Rhein moved the appointment of a committee of three to report on some suitable recognition of the services rendered by Dr. Carr, as chairman of the committee on law.

Dr. Carr moved the thanks of the Society to Hon. John E. Savery for the vast amount of work he had done for the Society. He had stood by the committee all through the matter, and had kept the chairman of the committee so informed that every objection had been met and examined before becoming public.

Dr. Curtis was familiar with Dr. Savery's work, and thought that outside of the committee of law, he had done more work than anybody else. He wanted to see Dr. Savery's efforts properly recognized.

Dr. Holmes knew of the amount of work that had been done, work necessary, because the tendency had been to force the bill out of sight.

Dr. Walker moved that the matter be referred to the same committee to which the resolution in regard to Dr. Carr had been referred.

The President appointed as such committee, Drs. Rhein, Jarvie and Holmes.

A resolution of thanks to the Hon. Robert Ray Hamilton was then passed, and the Secretary instructed to communicate to him the Society's action.

Dr. Line read the report of the Committee on Publication :

The Committee of Publication would report the following work, assigned it by rule or vote of the Society, as having been accomplished during the year just closed :

1st. The Charter and Code of the Society, a pamphlet of 36 pages, containing all matter authorized by the Society up to date, except the the resolution making the election of officers part of the business of the first evening's session. This will accompany remaining copies to be sent out as a paster. Marginal notes appear on each page, making its general contents easy of reference. Number of copies printed, 2,000 ; cost $69.60.

2nd. The Transactions of '87, a volume of 136 pages, printed a little late in the season, at an expense of $172.00, less $40.00 paid by the Rochester Dental Manufacturing company for the use of part of it as reprint.

3rd. The Transactions of '79, '80, and '81, known as the "lost" transactions, one volume of 174 pages at a cost of $216.90, or 25 cents per page, or 5 cents per page more than the sum authorized by resolution of last year, but the lowest figure at which it was possible to have the work done by responsible parties. The missing papers are those enumerated in our report of a year ago, plus incidents of office practice and discussions that no one would own.

4th. Preceptor and pupil contract forms. one a contract the other a bond for minors. There were 500 of each run off at a cost of $18.00

This ends all authorized printing by the Society, likewise the duties of the present publication committee, for which the chairman at least is profoundly thankful.

J. Edw. Line,
F. A. Greene,
F. French.

The Secretary read reports from the district Societies as follows :

Officers First District—President, William Wallace Walker ; Vice-president, J. F. P. Hodson ; Secretary, Benj. C. Nash, 433 West 57th street ; Treasurer, John I. Hart ; Librarian, J. Bond Littig.

Officers Second District—President, John J. Pitts; Vice-president, E. Clifford Wadsworth; Recording Secretary, F. T. Van Woert; Corresponding Secretary, F. S. Emerson; Treasurer, L. G. Wilder; Librarian, F. W. Moore.

Officers Third District—President, Hyman Rosa, Kingston; Vice-president, H. G. Nelson, Troy; Secretary, A. M. Wright, Troy; Treasurer, S. D. French, Troy; Correspondent, C. F. Wheeler, Albany.

Officers Fourth District—No report.

Officers Fifth District—President, B. T. Mason, Phoenix; Vice-president, C. J. Peters, Syracuse; Recording Secretary, R. F. Jones, Utica; Correspondent, S. E. Macdougal, Clinton; Treasurer, I. C. Curtis, Fulton; Librarian, W. H. Prentice, Utica.

Officers Sixth District—President, E. D. Downs, Owego; Vice-president, Wm. H. Hall, Binghamton; Recording and Corresponding Secretary, Myron D. Jewell, Richfield Springs; Treasurer, Frank B. Darby, Elmira.

Officers Seventh District—President, C. T. Howard, Rochester; Vice-president, A. Osgood, Bath; Recording Secretary, Frank W. Arnold, Rochester; Corresponding Secretary, W. A. White, Phelps; Treasurer, J. Requa, Rochester.

Officers Eighth District—President, F. E. Howard, Buffalo; Vice-president, M. B. Straight, Buffalo; Recording Secretary, S. A. Freeman, Buffalo; Corresponding Secretary, W. V. Grove, Buffalo; Treasurer, C. W. Stainton, Buffalo; Librarian, S. Eschelman, Buffalo.

Dr. Curtis wanted to know if permanent members could act as delegates from district societies? Was it constitutional to allow permanent members to represent district societies as delegates at this Society's meetings? The question had come up in the Fifth district society a number of times.

The President said if the matter were left to him, he should decide that a permanent member was quite competent to act as a delegate. It seemed to be a question of some importance. As it had come up in some of the district societies, some action should be taken.

Dr. Jarvie moved that the matter be referred to the committee on law.

Dr. Wright said the Third society had about a dozen active members, nine of the dozen being permanent members of the State Society.

His Society was entitled to eight delegates, and it had been their practice to make their permanent members delegates to keep the list filled.

The motion to refer to the committee on law was carried.

Dr. E. Parmly Brown, moved that two special committees be appointed by the chair, of two or three members each,

First : A committee to report at the next meeting upon the advisability of, and best mode of procedure for, preparing for the benefit of members of the dental societies of New York and New Jersey, a delinquent list.

Second : A committee to report at the next meeting upon the advisability of asking for a law to protect dentists from dishonest patients, something like the hotel keepers' bill.

Motion No. 1, Dr Brown explained, was to devise means for heading off the "eminently respectable" who make a business of beating decent people out of hard-earned money. He gave names and stated amounts now due several members of the profession in and about New York, himself among the victims.

Dr. Cook heartily disproved of the appointment of such a committee. Any one having money to collect could go to Dunn & Co.'s or Bradstreet's, and for a consideration have it done ; and also ascertain whom to trust and whom not to trust. It seemed to him a very queer sort of proposition to bring before a scientific body. He asked, "Are we a commercial agency ?"

The President gave it up.

Motion No. 1 was lost.

Dr. Brown called for a division of the house, which was ordered, and the motion again lost.

Motion No. 2 was then taken up.

Dr. Brown said he merely asked to have a committee appointed so that the matter could be put into shape for consideration another year.

Dr. Holmes moved its reference to the committee on law.

Dr. Brockway objected, and said he would vote against it upon the same ground as he did against the other. He thought the matter without the province and beneath the dignity of the State Society.

Dr. Cook said he would vote to refer if that meant to "kill," which he believed it did.

Upon a division of the house the motion to refer was carried, which very beautifully illustrated the operation of "splitting the difference," also the State Society's disposition to keep members in the best of humor.

The President here wished to make a statement. They had had in New York a number of gentlemen on standing committees, appointed somewhat with reference to their peculiar abilities to fill their respective positions, and in many instances within easy reach of New York city. The object was that the President might have abundant opportunity to consult with these gentlemen, who represented the State Society as much as himself, and because of these relations he had called them "my cabinet." They had talked up the subject of celebrating this, our twentieth anniversary. It was their opinion that it would be very proper to close our meeting with a banquet, but, rather than assume the position of dictators, or of positively saying it was best for the society to have such a banquet, they thought it fairer and wiser to send out "flyers," and he thought a postal card had been sent every permanent and delegate member, asking advice. As a result about seventy-eight answers had been received, sixty to seventy being in favor of a banquet. Three-quarters of those in favor of the banquet were in favor of its being paid for individually rather than from the treasury. Upon the near approach of the day of meeting it became necessary for some one to assume responsibility and take action. Such action had resulted in engaging the proprietors of the Delavan House to dine us the following day, at 3 o'clock. He thought, under the circumstances, it was eminently proper some action should be taken upon what had been done. Would they like to have a banquet as a part of the anniversary exercises?

After some general discussion, Dr. Rhein moved that they adjourn on Thursday, the Dental Society of the State of New York to proceed to the Delavan House and celebrate its 20th anniversary by a banquet.

On motion of Dr. Greene it was made an individual affair.

The President presented the diploma of the society to those who had been recommended by the Board of Censors. He said he wouldn't have passed through the ordeal for a thousand dollars. He couldn't have done it. Perhaps he had known enough once, but in the course of time the memory weakens and much that a man might have known passed from him. He congratulated them on having passed through what he believed to be the most trying they could possibly be subjected to by any examining board in the world.

The question of the propriety of the state board passing upon the qualifications of candidates was two-sided. It was the same question that had been brought up about the faculties of various universities. Should a man receive recognition of his attainments from any other source than a college, after he had passed its prescribed curriculum? Some universities insist upon it that no student should be entitled to the degree of that particular university until he had complied with all its techicalities.

There were more liberal minded institutions, however, that looked upon it as of no consequence where the individual had obtained his knowledge, provided he proved that he had that knowledge. He thought that in this idea the most liberal had concurred. If he were not mistaken Harvard and Columbia received men who had studied and acquired their knowledge entirely separate from those institutions. He thought the history of our dental colleges showed conclusively that it was not necessary that a man should go through the curriculum of the college to obtain a high standing in the profession and practice of dentistry. The list of those who had received the degree of "M. D. S." would show the average of the most skillful practitioners above the average of those who had received their degree from dental colleges. It was but fair to say that, because there seemed to be on the part of some dental colleges that know but little of the Society, the idea that they were a rival body, granting and conferring degrees in opposition to colleges. There had never been, however, a greater mistake.

Some of the dental boards and colleges had referred to the Board of Censors as a "white-washing" board. When he referred to the Board of Censors as a "white-washing" board the about-to-become M. D. S.'s smiled. *They* knew they had not been white-washed very much; but had earned the degree which he was happy to be permitted to confer upon them.

All visiting dentists were accorded the privileges of the floor, except of course, on matters of business of the society.

AFTERNOON SESSSION.

The meeting was called to order by the President and the minutes of the morming session read by the stenographer, corrected and approved.

The President announced "Incidents of Office Practice."

Dr. Ottolengui spoke substantially as follows: Since I first commenced practicing I have paid a great deal of attention to dentine, and after trying various preparations and finding nothing that would answer, except in one or two cases I adopted the method of giving nitrous oxide, controlling extreme cases in that way; but I met with a case one day that I could cure by that method. It was where a patient had a tooth so sensitive that she fainted in my chair when I used a little punk to dry out the cavity. I proposed gas, but she had a prejudice against it. The tooth was so sensitive that I could not even put in a temporary filling, and I was obliged to let her go without relief. I then commenced to consider the different methods known to me, and others given me, in the hope of finding something better. I found hot air very good, but that chloride of zinc was perhaps the more useful. I could only see one action common with the two remedies, that of dehydrating. I wondered how dehydration could give relief, and I came to the conclusion it was from action upon the dentinal fibres. I thought anything that would cause these fibres to contract would aid me. Acting upon this idea I sent for my patient, and in the hope of being relieved, she was willing to suffer a little pain, and by a blast of hot air I succeeded in getting the cavity in the tooth dry. I then used ether spray. The end justified the means, because I cut that tooth for five minutes, and then filled it with gold. Since that time I have performed seventy operations and have not found a single instance in which I could not control the trouble and have patients say that while the ether was somewhat painful at first, they hoped I would never change to anything else. You must put on your rubber dam very carefully, because ether is very unpleasant in a patient's mouth, and you must be careful the ether spray does not get into the eye. In order to prevent it getting into the mouth, I use pieces of spunk, holding a portion of it in the vicinity of the tooth. In conclusion, it has been so pleasant to my patients and so beneficial to me, that I could not refrain from letting every one know about it.

Dr. Brockway said : I made the discovery for myself several years ago, that as a tooth was made dry the sensibility was much diminished. I employed the method in question some time with success, but do not now as much as formerly, for the reason that I have sometimes fancied that the chip dust blown out of the cavity was prejudicial to the use of cohesive gold. Whether there is anything in that or not I am not sure, but latterly I have been in the habit of preparing my cavities wetly, having my student throw water on the burr while I cut. By this means one can cut rapidly and without heating the burr, which produces the pain ; the burr is also kept from clogging. I have sometimes moistened a piece of cotton or bibulous paper with chloroform and placed it in the cavity, and I have found that the sensitiveness was very much diminished, whether by the direct effect of the chloroform upon the tooth, or by inhalation of the chloroform, I am unable to say. It has certainly worked admirably and strikes me as more direct and simple than that described by Dr. Ottolengui, although I am of the opinion that the method of which he speaks would produce the desired result.

The President said: I spoke this morning of having put certain questions to several of my confreres; one, "What is the most vital question in dentistry?" Isn't this one of the most vital we have to consider? Is there anything that gives us more satisfaction, than to relieve a patient from pain, when suffering the preparation of a tooth for filling?

Dr. Greene said: I have been quite successful in these cases, by letting the patient have a few breaths of chloroform. I have a wide necked bottle into which I put absorbent cotton with a little chloroform."

Dr. Jackson said: I think we should come to some systematic understanding as to which is the better method, the dry or the wet; in other words, whether to incapacitate the pulp or anaesthetize it. I think the latter method is very difficult, unless very highly organized. In the dry method we do it by the extraction of the water. This is done sometimes by the use of liquids that have a great affinity for water, like glycerine or alcohol.

Dr. Palmer said: I will not add to what has been said as to the agents used as obtunders, but there is a limit to their use. I regard the filling of a tooth so highly organized as to cause the pain mentioned, as an operation of great danger. If an obtunder be used to render the operation possible, the tooth will return to its original condition. Thermal changes bring about a condition that renders it exceedingly dangerous to fill during that period. If we had a perfect obtunder we could do better. In case a tooth was not sufficiently calcified, I would rather insert a gutta percha filling, and allow nature to render it less sensitive. The use of imperfect obtunders has been the cause of the loss of many teeth.

Dr. Holmes said: I took some pains to test the sensitiveness of teeth by raising the temperature to some hundred degrees, by using a hot air blast and gradually increasing the heat till I had brought it up to a given standard. I then used the rubber dam and went into the cavity with carbolic acid. In most cases the patient could endure the gradual increase of heat, and when that was the case I could uniformly relieve the sensitiveness. I have had better success with hot air, in connection with some agent like carbolic acid, than anything else.

Dr. Rhein said : The method spoken of by Dr. Ottolengui I think well of. I have given it a trial on two patients since I heard him relate the method, and found it successful indeed.

Dr. Ottolengui said further : I have used spray where I could so control the sensitiveness of the pulp, and to such an extent, that I could remove it. I can only report what I know and leave it to your judgment. My first case was the one narrated, and it occurred a year ago. I have seen the patient recently and she has had no trouble with the tooth, nor have I had any trouble with other teeth during that time.

Dr. Atkinson said : We can have no better demonstration of the great need of a professional body than to listen to such a discussion as this. We can see that hardly any one of us has the same understanding of the circumstances brought to his observation. One has a yard stick and measures according to his stick, and when we find some of these men have called distance a millimetre and some a mile, we are surprised at the differences in the conceptions of these men. Dehydration, taking away of water, is done either by cooking or freezing ; by excessive heat or the deprivation of heat. It is heat that does its work, but in different ways. We get this effect by coagulating that part which conducts what we call pain or sensibility.

The Committee on Practice, a committee of annually increasing interest and importance, reported through Dr. Rhein, in a most elaborate and comprehensive manner, the full text of which and illustrations, he was priviledged, on request, to send to the *Dental Review*.

The President congratulated the author. He said the report was full of meat—full of "nuts" that would take the Society a week to crack and longer to eat, if taken seriatim. He knew they would pay the author the respect he was entitled to for the vast amount of labor expended in preparing it, by ample discussion of the facts touched upon.

Dr. Brockway had listened to the report with great interest and satisfaction. There were one or two points on which he wished to comment. In the reference to scaling instruments, members of the committee seem to be divided in their preferences for the pushing or pulling motion. He was surprised that the scraping motion had been entirely overlooked. It struck him that the scraping motion, as employed in the use of Riggs's scalers, had proved of great benefit to those who had learned how to use them. But perhaps the committee had included it by some stretch of language. In order to use the Riggs' scalers to advantage, one should practice with them for some time, as he had found out in his own experience. He had had the instruments for perhaps a dozen years, but confessed that it was several years after he had got them before he really derived much advantage from their use. Before that he would have been quite willing to join in any condemnation of them that he might have heard. Now he relied upon them, although he had nearly all other sets of scalers in the market. He relied upon them more than all the others combined. Reference was also made to the use of certain amalgams—copper amalgam which had been lately introduced, and which had been inferentially, at least, condemned by the committee. The committee expressed the opinion that copper amalgam was by no means as good as some of the higher grades of other amalgam. He begged to take exception to that statement. From his own experience, and he had used copper amalgam off and on twelve to fifteen years, he had been led to believe that in some situations—notably buccal cavities on surfaces of soft molars—they were better filled than with the so-called high grade. He did not believe the high grade would do as well as copper. The only objection to the copper was that it turned extremely black. The objection would have no apparent weight in the places mentioned.

Reference was made also to gutta percha. The statement was made that gutta percha could only serve a temporary purpose in any case. He believed there were cases where gutta percha was one of the most permanent fillings that could be made, notably in buccal cavities in soft teeth, where the copper amalgam would also serve quite as well. He used gutta percha in buccal cavities in third molars that were difficult of access ; here they were not subject to wear from the tooth brush. His experience had been that those cavities were managed with great ease with gutta percha ; it served a most admirable purpose, and could in such cases be well classed as a permanent filling. He agreed with the committee in their condemnation of the matrix for many fillings. He had never been able to attain that success with the matrix in making gold fillings that some have, but in making fillings with amalgams the matrix had proven one of the most useful of appliances.

Dr. Starr wanted to understand just what Dr. Brockway meant by the "scraping" process. Now, the pulling motion spoken of by Dr. Rhein was really a scraping process, and it would not require a great stretch of the imagination to include the pushing motion in the same catagory.

Dr. Brockway meant by "scraping" motion, a lateral motion, as you get it with the Riggs scalers. The idea of the Riggs scaler is to use a scraping motion, not a pulling or pushing motion.

Dr. Atkinson was almost in complete accord with the report, but there were some points to which he wished to call attention. The first thing that struck him as important was the disposition to regard a single specimen of unfortunate implantation as indicative of failure, and laying too much stress upon it, as in the case of Dr. Younger's tooth, which had been subjected to microscopical study. The case referred to could be supplemented by others that might coincide with or contradict the condition described, or show conditions utterly dissimilar. He endorsed most fully and was heartily in accord with the statement that it was too early to draw conclusions, but the committee should have stopped there and not drawn quasi conclusions from the one case described. If there had been any connective tissue formed after the disintegration of the tooth, that settled the question forever. When we could get enough of that kind of action, we would have such a union of implanted teeth as would bring us to a form of tissue demanded in the territory, whether it be connective tissue, or bone tissue, or secondary dentine, simply by continuing the operation. What was involved in this operation? It was the healthy status of the tooth implanted; and the power to determine when a tooth was in such condition as to correspond with the mouth in which it was placed, so that it would be kindly received and made a part and parcel of the dental family.

He rejoiced that they had engaged in this kind investigation, and glad for what had been done. He thought it would eventually lead to a change of practice, but wished to say, "Don't go quite so fast." He regretted that there were not enough of our fraternity willing to go into these investigations in common with those already there. One might take the healthiest blood from one individual—healthy for his organization—and introduce it into the veins of another who appeared to be equally healthy, and set up a schism in the family. Whether there is a microbe that is food to the one and poison to the other is a question; but we are upon the verge of proving it by those dentists who are studying histology and pathology. He was astounded to think of the cloud of ignorance which had fallen over his former study, which caused him to decide against implantation. When it had come to him that *im*plantation was not *re*plantation, but was the introduction of a tooth into a new socket, the cloud had been lifted from his eyes and mind. He saw a hope in that where teeth had not come from diseased sources.

MEMORANDA OF THE MEETING.

The Committee on By-Laws saw no necessity for further amendments to the code.

Drs. A. R. Starr, first district, J. H. Holley, second, P. S. Garvey, third, A. Ritter, fifth, and W A. White, seventh, were made permanent members.

The following telegram was received at one of the sessions :

"*Illinois State Dental Society in Session at Cairo, to the New York Society, Greeting:*

"We are having a good meeting and send our best wishes for your success.

"E. B. ROHLAND, President.
"GARRETT NEWKIRK, Secretary."

When Dr. Baxter read the following, the Society forgot the object of the meeting and unconsciously resolved itself into a Chicago and St. Louis convention combined, giving three cheers for the Governor, three for the chairman of the Committee on Law, and a "tiger" for both :

MAY 10, 1888.

MY DEAR SIR :

The Governor has taken up the bill you referred to this morning, and just signed the same. I am truly yours, WILLIAM G. RICE,
Private Secretary.

DR. E. C. BAXTER, STATE DENTAL SOCIETY,
City Hall, Albany, N. Y.

THE TWENTIETH ANNIVERSARY BANQUET.

The fourth or morning session was continued at the Delavan, the private dining hall being all but filled with members and guests.

At the conclusion of the feast, speeches were made by Drs. Kingsley, Atkinson, Southwick (the only one present of the few living who had put the Society on its legs), Pitts, Lamb, Jewell, Fleishman (for the medical profession), Ottolengui, Watkins, (of New Jersey), Baxter and Pinne.

The legislature was on the eve of adjournment, which will explain the absence of those from whom letters were read, and others who failed to report until later, when they did so personally.

The following are a few of the replies :

EXECUTIVE MANSION, ALBANY, MAY 2, 1888.

DEAR SIR:

I have to acknowledge the invitation conveyed by you on behalf of the New York State Dental Society, for its banquet to be given on the evening of May 10th, and to express my regret that other engagements will make it impossible for me to be present. I am, very truly yours,

DR. E. C. BAXTER, Chairman, &c., DAVID B. HILL.
Albany, N. Y.

STATE OF NEW YORK.
LIEUT. GOVERNOR'S ROOM.
ALBANY, MAY 5, 1887.

Lieutenant-Governor Jones desires through you to thank the State Dental Society for their courtesy, and regrets the impossibility of acceptance.

To EDWIN C. BAXTER, Chairman Committee,
160 State Street, Albany.

CITY OF ALBANY,
MAYOR'S OFFICE.
ALBANY, MAY 8, 1888.

EDWIN C. BAXTER, D. D. S., *Chairman Committee State Dental Society.*

Dear Sir:—Your invitation to the banquet of the State Dental Society, to be held on the 10th inst., received, for which please accept my thanks. I regret that press of business will prevent my availing myself of your kindness.

Truly yours, EDWARD A. MAHER.

28 EAGLE STREET, ALBANY, N. Y., MAY 7, 1888.

MY DEAR DR. BAXTER:

I hope to give myself the pleasure of accepting your kind invitation for Thusday. Believe me, yours sincerely,

A. VANDER VEER.

At the conclusion of the speeches and letter reading, President Kingsley thanked the Society for the generous support accorded him, and bespoke a continuance of the same for his successor.

The President-elect then assumed the first office in the gift of the Society, and thanking them for the great and unexpected honor, proceeded to make the following appointments:

Arrangements—Drs. E. C. Baxter, S. D. French, A. C. Rich.
Business—Drs. Alfred C. Starr, C. S. Butler, C. K. Van Vleck.
Prize Essays—Drs. G. L. Curtis, F. E. Howard, J. J. Pitts.
Publication—Drs. M. D. Jewell, C. C. Smith, Y. F. Jones.
Ethics—Drs. W. A. White, J. J. Mills, C. W. Harreys.
By-Laws—Drs. John I. Hart, S. E. MacDougal, F. T. Van Woert.
Practice—Drs. B. A. R. Ottolengui, O. J. Gross, Hyman Rosa.
Law—Drs. William Carr, C. F. Wheeler, M. E. Elmendorf.

The Society then adjourned until the second Wednesday in May, 1889, at Albany.

FURROWS ON THE FINGER NAILS.

Nearly twenty years ago Dr. Wilks directed attention to the fact that a transverse furrow appeared on the nails of the hand after a serious illness. Medical literature has since then contained a few references on the subject; he again brought the subject before the Pathological society at its meeting on March 20th, and related a remarkable case. In that case the furrow was caused by three days' sea-sickness.—*Medical Record.*

DISCRIMINATION IN THE USE AND SELECTION OF ANÆSTHETICS.

BY I. C. CURTIS, M. D. S., Fulton, N. Y.

[Read before the Fifth District Dental Society and Central New York Medical Society, Utica, April 12th, and Rochester, May 15th, respectively.]

Mr. President and Gentlemen :—As your committee requested me to select a subject and prepare a paper for this meeting, I will briefly state that in the selection I have been prompted by the perusal of a paper by Hunter McGuire, M. D., read before the Medical Society of Virginia, October 19, 1887, entitled, "The Choice of General Anæsthetics in Surgery and Obstetrics."

The essayist has given us a most valuable paper and pointed out many shoals and quicksands that modern surgeons may steer clear of ; but he has not been as general in his selection of anæsthetics as one could wish, having confined himself exclusively to chloroform and ether.

In my paper to-day, I do not propose to confine myself to any one or two drugs, but first ascertain the condition I desire the patient to be placed in, and then use that anæsthetic which will most nearly produce that condition.

There are several questions that the practitioner must needs ask himself and become satisfied as to the answer, before an operation should be performed.

First—Is an anæsthetic necessary ?

Second—Is the patient a proper subject for its use ?

Third—What effect do I desire to produce ?

Fourth—Have I the means at hand to be used in emergency in attempting resusciation ?

In answering the first it can safely be said that if the shock to the nervous system would be greater to endure the operation without an anæsthetic than the shock of its use, then the drug is indicated.

But one cannot fully answer the first without involving the second and third.

In reply to the second, I would emphatically require an examination, and unless the physical conditions were favorable, no amount of persuasion should induce one to jeapordize the life of a patient.

If the first, second and fourth questions can be answered affirmatively, then the third question will materally assist in the selection of the anæsthetic to be used, viz : "What effect do I desire to produce ?"

This will vary with the operation to be performed. If it is desired to reduce luxation, then there are two conditions to be produced, relaxation as well as anæsthesis.

The same will apply to cases in obstetrics, for it is to be borne in mind that the muscles that contract in expelling the fœtus, are not voluntary muscles. In such cases chloroform or ether, preferably the former, will produce the best results ; and in operations upon children up to the age of six or seven, the ease with which chloroform can be administered and the small quantity required to produce the results, seem to favor its use.

In most operations of a serious nature it is not necessary to resort to such heroic and dangerous anæsthetics.

The very frequent reports of fatal cases from the use of chloroform or ether, is proof that it is fraught with the greatest danger, and in the hands of the most skillful, and under seemingly favorably conditions, deaths are not rare.

We are confronted with the following statistics by Prof. E. Andrews, (Chicago Medical Examiner, 1870) :

Death rate from the administration of chloroform	1 in 2,723
Sulphuric ether	1 " 23,204
Mixed chloroform and ether	1 " 5,588
Bichloride of methyline	1 " 7,000

Another serious objection to their use, is the accumulation in the system, and subsequent decomposition of the above named drugs, producing in many cases serious derangement of both liver and kidneys.

In more than 75 per cent. of the cases where either of the above named drugs are used, a disturbance of the stomach follows, and it is several days before it is eliminated from the system, followed by more or less exhaustion, in duration from a few days to several weeks.

In the paper read by Dr. McGuire and referred to in my introduction, no mention is made of nitrous oxide gas, a drug that has assumed gigantic proportions in its use during the past few years.

Medical journals have been strangely silent in regard to it, and if any mention is made it is in regard to its use in minor surgery.

The first question—What are its capabilities ?

Anæsthesia can be produced in from thirty to ninety seconds, and maintained for an almost indefinite length of time (with the modern inhaling apparatus). After anæsthesia is produced it is an easy matter to keep the patient completely anæsthetized by turning a valve that admits either air or gas, as the exegencies of the case may require.

The writer has kept a patient under gas for twenty minutes at a time, while a very painful operation was being performed on the eye ; the patient recovering from the effects of the drug in from one to two minutes, with no nausea or other unpleasant effects.

There is no operation, (save upon the mouth or face) however severe, that complete insensibility to pain cannot be maintained throughout the entire operation, and the reason of those two exceptions is that inhalation of gas can not be continued from time to time, as is required to maintain complete anæsthesis.

But one administration, if carried to the extent of stertorous breathing and insensibility, of the eye to the touch of the finger, is usually sufficient to produce complete anæsthesia during the extraction of ten to fifteen teeth.

Those operators who do not obtain the best results from its use, are as a general thing, afraid of it, and to such I would say, either overcome your fears and administer enough to produce the desired results, or else abandon its use entirely.

There has been manufactured and sold in the United States, during the past two years, from 2,000,000 to 2,500,000 gallons per year. (This is an estimate based upon facts obtained from the different manufacturers.)

Taking ten gallons as the average quantity each patient consumes, and we have at the lowest estimate 200,000 administrations per year.

Last, but by no means least, comes the question of safety, although I do not consider that there is any anæsthetic that is absolutely safe. Far from it, for there can be no functional disturbance of such magnitude without a corresponding effect upon some of the organs disturbed.

But the fact of the at least 400,000 administrations of gas during the past two years, with no fatal cases reported, is very significant, and carries with it a great deal of force.

From the date of its discovery in 1776, and first use as an anæsthetic in 1844, up to the present time, but four deaths have followed its administration in this country, and these at a time when each operator made his own gas.

It is very probable that part, if not all, were due to impurities either in the materials used or imperfect preparation. At the present time no deaths have resulted from the use of liquified gas.

Dr. Turnbull says, "Nitrous oxide gas is the safest of all anæsthetics." (Guilford, page 25.)

Mr. Underwood, of London, says, "Nitrous oxide gas is the best anæsthetic at present known to the profession." (Guilford, page 25.)

Dr. J. Foster Flagg, whose name and position are too well known by the profession to require comment, in reply to inquiries made by the writer, says "I have never known or heard of a case where death was directly attributable to liquified nitrous oxide gas."

In my own experience with gas, there has not been a patient that I would not anæsthetize again if necessary, save two or three, and those were very young. In the young subject I have found more of a tendency to excessive lividity of the face and hands, as well as an increased tendency to spasmodic action of longer duration, than in the adult.

In one reported fatal case, supposed to be due to nitrous oxide gas, a post mortem examination revealed the fact that the mouth-gag, consisting of a bottle cork, had lodged in the trachea, causing death by asphyxea.

In operating on the mouth there is always danger of a foreign substance becoming lodged in the trachea.

It is the custom with a large number of ladies to carry pins in the mouth for hours at a time and be wholly unconcious of their presence, and I can refer to one case in my practice where the patient, after anæsthetization and removal of two or three anterior teeth, expectorated with the blood seven pins. In this case it was providential that an accident did not occur, and it is safe to say the writer will not permit a second occurrence, although in this case he supposed he had made a thorough examination.

In regard to bromide of ethel, it has never come into general use, and from its, at times, peculiar action upon the heart, has deterred many from its use. In fact the profession know too little in regard to it to give an intelligent opinion.

As to Mayo's vegetable anæsthetic, chemical analysis has proven it to be little else that than nitrous oxide gas flavored with checkerberry (comment is unnecessary); a practice which is growing in favor, but to me seemingly pernicious, consists in mixing anæsthetics to produce a modification of effects. For instance, chloroform and alcohol, chloroform and ether, and in the so-called "vitalized air" (a definite, or in many cases an indifinite, mixture of chloroform and nitrous oxide gas.

No one can act intelligently under the circumstances, for the two drugs act differently, and symptoms which are favorable with one may indicate almost fatal conditions with the other ; and I would protest against adding another factor of danger to that already existing.

In conclusion, I would say that all things being favorable to the administration of an anæsthetic, it is well when, in the language of Dr. O. W. Holmes, it can be said : "The knife of the surgeon is steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony is forever smoothed away."

SANITY.

BY ELTON R. SMILIE, M. D., San Francisco, Cal.

A perfectly sane mind in a sane body does not probably exist within the boundaries of humanity, and its possibility can only be discussed in a comparative acceptation. But the evident gradual depreciation of human existence, in health and longevity, with the mental concomitants which afford rational zest to enjoyment, are too painfully apparent from the rule of discord, to be gainsaid. The gradual accession and the increase of artificial habits from the patriarchal period, and their deleterious effects upon all the rational influences which should contribute to healthy and happy unity of organic nutrition from sane mental direction, have been vitiated. To the thoughtful, these cases of degeneration must have become painfully evident from the increase of disease in multiplied diversity and virulence, as well as in fatality and extent of hereditary dissemination. In the almost universal inheritance of this taint of disease, causing aberation in mind and matter, each accession tending with increased rapidity to racial extinction, we have certainly reason to apprehend the speedy consummation of our final destiny. With diseased infection as our first inheritance from transgression of Nature's laws, we must expect dissolution to follow the gradual course of inception up to the period of the taint's final and fatal development. As premonition is a law of mind that anticipates natural results, their interpretation requires only the index of sequent demonstrated causes for like effects. If a person dies from the living decomposition inflicted from the taint of hereditary cancer, premonition impresses the heirs with the conviction that they have incurred the inherited taint. If wise in their generation, or under the guidance of superior medical direction, they will endeavor to abate the activity of the decomposing virus by an antiseptic diet, so that the healthy stamina of vitality can recuperate in the absence of an accustomed exciting cause of degeneration.

With the fatal influence of Vanity's fashions, inherited and perpetuated through the breeding source of woman's birthright,—through them the leading direction of self restraint should be advocated and enforced by example. As all grades of society, as they now exist, are ready with judgment to acknowledge that woman with her faculities cultivated holds supremacy over man, when in freedom from the corrupt influence of passion, to her should be delegated the self restraining influence of example. Of this we can be certain, if she is allowed the privilege of exercising her judgment upon questions of hygienic education, the influence of the sex would soon gain the sway in all matters pertaining to temperance in eating and drinking; and with the lead of moderation, the same power of self control over the passions would take the initial step for reestablishing the rule of sympathetic reason. The superior constancy of woman once enlisted in the good work of sane regeneration, she would become enthusiastic over the benefits she would be enabled to confer upon her kind. As with acknowledged proof, imitation is the source of vanity in woman which makes novel absurdity an insane source of emulation, ridicule can alone make her realize the distinctions which exist between reason and folly in the self imposed labors of life. As one universal beneficial result will accrue from making woman eligible for an apprenticeship to the lighter manual labors of life which require more tact than strength in execution, we can take an average of physical and mental capacity as exhibited in the varied labors and occupations of the world's savage and civilized populations. This will give us in fair exhibit of sane influence the great advantage of a distribution of the active labors, even to a predominence in favor of woman, in as much as she out numbers the male. This will bring out and display the emulative process of both mind and body, and in their activity and ambition of distinction as representatives of ability in the sexual capacity, it will create or extend by comparison a better knowledge of each others adaptation to suitable occupations in life.

By making coadaptation the joint study of the sexes in the practical employments of life, the freaks of passion would find less incentive for evil, as active occupation would keep both body and mind usefully employed. To harmonize and interest, as well as to keep the faculties clear, the instructors and superintendents of youthful students should understand all the monomanias which originate from the effects of over-indulgence, which has proved the basis of all the aberrations of humanity. Often in the early stages of childhood premonitions of monomania has been discovered and corrected easily, which would otherwise have developed into the genus "crank," of a life destroying nature and disposition. The rapid increase of these fatuitous sources of "rowdyism" are but indications of mento-physical degeneration and incipient insanity, which, like irregular and depraved teeth, refer the thoughtful to remote constitutional cause which requires correction before the rule of anarchy reaches beyond control.

Public and private acts under the approved control of society influence, when duly weighed with the judgment of such reason as remains of our natural inheritance, appears in the enactments of the age very much like the revival of Cervantes' burlesque of Don Quixote with modern artificial appliances instead of ancient armor. The tendency toward the monkey extreme, in artificial imitation of dress and action, shows that the balance of the choice between the head and tail, as a source of direction will soon be decided by female example, as well as the question, " whether the reasons of cause and effect are worth the labor of investigation and demonstration ?'

While frivolity bears a part so prominent in the direction of the *politesse* of society, the counterfiet influence of shoddy pretension will be the acting substitute for sanity, until the caudal extremity in reformation obviates the necessity for the exercise of reason by the tadpole inaugeration of a younger race with the initial requisites of tail and jaws. Even Luther and Milton in the prophetic forecast could not fail to interpret from the signs of the times the future destiny of mankind from the effects of degeneration, as in their depictions of the past. The devils and grades of evil spirits of their creation are the exaggerated depictions of insanity for the expression of transgressions of nature, clothed in the spirit of religious retribution.

The insanity of retributive fanaticism like Bunyar's conjures useful thought that renders to the young an ideal for the correction of passions prone to indulgence. In practical demonstration, in contrast to the demon spirit of nihilism bred from indulgence of the carnal appetites Bungaris and kindred hallucinations, are emanations of soul origen, which like the pleasant odor of flowers neutralize with anesthetic boquet the evil influences to which we are exposed in association with the unrefined grades of selfish instinct.

HILL'S STOPPING, ITS USE AND ABUSE.

BY I. C. CURTIS, M. D. S., FULTON, N. Y.

[Read before the Fifth District Society at Syracuse, N. Y.]

In order to prevent undue criticism of the few remarks I am about to address to you I wish to preface them by saying that I do not at any time refer to teeth of such dense texture that they can be saved, no matter how poorly operated upon nor with what material filled, but rather to that class of teeth that no matter how well filled are sure to give way in course of time. Were we to find teeth of good, strong, dense texture only, there would not be the controversies over the choice of filling materials nor of the manner of manipulation. But such is not the case. Unfortunately those who most need our services are those whom nature has endowed with teeth whose vitality is far below par, and it is to such, that I refer in my remarks.

The subject as given by your committee, "Hill's stopping, its use and abuse," can best be handled by your essayist by pointing out where in his opinion it would be proper to use gutta percha, and where not. Without question, gutta percha is as valuable an adjunct to the list of dental materials as we can well find, and the failure to discriminate where it is proper to use, as well as the ease of manipulation, have led to its discredit many times when the material should not have been censured.

As a root filling, for example: Chlor-perch of the consistency of milk pumped into the nerve canal followed by a well forced up gutta percha point makes, to my mind, the best root filling.

I find by varnishing the walls of cavities (especially if they are near the cervical margin) with a very thin solution of chlor-percha, and not allowing it to extend to the orifice of the cavity save at the cervical border, adds much to the durability of approximal fillings in bicuspids and molars, where, unless we have, self cleansing space, decay is sure to recur if filled with any of the metallic fillings. And while upon the subject of approximal fillings of bicuspids and molars I wish to say, that when the articulating wall is of sufficient strength and is unbroken, a gutta percha filling will out-last all other materials be they ever so well inserted, unless a larger self cleansing space is made to prevent re-decay; for it can be put down as a settled fact that in teeth of the class I refer to, and decayed on their approximal surfaces, it is only a question of time when filling that is not in harmony with dentos will fail, and that usually at the most vulnerable part of the cavity, namely, the cervical border.

Harmony with dentos is a subject that is demanding our attention more and more, and we have not in our list of materials any substance that is more in harmony than gutta percha, be it electrical, chemical or thermal.

Upon the labial surfaces of lower incisors and canines and buccal surfaces of bicuspids and molars, both upper and lower, gutta percha has done in my hands what no other material could do, and the ease with which it can be replaced if it becomes necessary by reason either of disintegration or abrasion, and the perfect condition of the margin one finds when it is removed, leads one to admire the material and wonder how it does it, and the grateful patient amply repays you when they say "how free from pain that operation was."

With young patients, and those whose teeth have not become dense, it is common to find approximal decay of the incisors. Not only are the teeth extremely sensitive to the touch of the instrument, but to other mechanical means employed, and much greater care must be taken to guard against thermal changes.

A good gold filling inserted in such a place at such an age is almost sure to require renewal in two or three years. Under such circumstances it must be better to fill with gutta percha till such time as the teeth are in a condition to receive a good permanent gold filling, and one thus treated will be in much better condition to receive a permanent filling than it would were it to be filled and refilled with gold.

I wish to call your attention to one single case in practice. March 1885, W. B., aged 12, nervo-bilious temperament, came under my care: found the teeth soft, but fairly good for the age and physical condition of the child, he having never been particularly strong and rugged. Upon examination found six cavities in superior incisors upon approximal surfaces; filled four with gold and two with gutta percha. Those filled with gutta percha were very badly decayed, extending high up under the gum. After two years I find that decay has extended above the gold fillings, necesitating their renewal, while the gutta percha is doing its work as well as when inserted. To me plainly gold was contra indicated. This is but one of the many cases that comes in the practice of every operator.

Some operators use gutta percha as a covering to nearly exposed pulps, but care must be taken that it is not in large quantities, else the elastic properties of the material act disasterously.

These are but a few of the many places that its use is not only admissable, but desirable. I will say nothing in regard to teeth that are so frail that some plastic must be used, for each operator has his peculiar favorite.

We now come to the abuse of this excellent material. We often hear it said that if gutta percha would not disintegrate, and had the power to resist mastication, that no material would be a better preserver of the teeth. Then plainly it is contra-indicated on the articulating surfaces of teeth unless no other material will preserve the tooth, and if used it must be with the expectation of a frequent renewal.

Upon the labial surfaces of superior incisors the unsightliness of gutta percha must exclude its use save in exceptional cases. But plainly it is an abuse to use gutta percha when good permanent gold fillings can be inserted (or that of any other permanent material) when the reason for so doing is a matter of expense to the patient or ease of manipulation to the operator.

The permanency of gutta percha fillings is largely dependent upon the quality of the material as well as the skill in insertion, but great care should be observed that neither the material or instruments are over heated, for nothing is more fatal to a a gutta percha filling than heat rotting.

However unstable gutta percha fillings may be, I prefer to replace them when necessary than to replace the teeth with crowns or artificial teeth.

THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The next meeting of this association will be held in Louisville, Kentucky, Monday evening, August 27th, at 8 o'clock, and at other times during the week, between the sessions of the American and Southern dental associations. Every State board should be represented.

Sea water is of almost uniform saltness—2.7 per cent, or about a pound of salt to four gallons of water.

THE ACIDS OF THE STOMACH AFTER AN AMYLACEOUS DIET.

Some time ago it was stated by Ewald and Boss that after a meal of two ounces of wheat bread and water, the stomachs of healthy persons (previously fasting) showed at an early stage "lactic acid of fermentation." These authors also said that the hydrochloric acid which appeared later, ultimately entirely replaced the lactic acid. On the other hand, after a meal consisting of boiled starch, they found hydrochloric acid present in all stages of digestion. Lactic acid, however, was not found.

Dr. Rosenheim has quite recently undertaken an experimental inquiry into the same subject. By using the method of Cahn and Von Mering, the only trustworthy method from a chemical point of view, he has arrived at results differing in certain respects from the above. In every case the stomach of the (fasting) person experimented upon was several times washed out ; then the test meal was given, and at the desired time the gastric contents were obtained without dilution. The following results were obtained after the introduction of 50 grammes of wheat bread (equal to about one and three quarter ounces) and 150 grammes of water (about five ounces:) —1. Free hydrochloric acid can be shown to be present early (0. 3 per mille after fifteen minutes,) rapidly increases (1 per mille and more after 30 minutes,) and then it remains at the same level until the complete elimination of the chyme has taken place. 2. Lactic acid is found to be present from beginning to end in fairly constant quantity (0. 3 per mille.) 3. Volatile acids are always present, but only in extremely minute quantities.

Investigations made in exactly the same manner on sick persons afforded very important results in regard to cancer and hyperacidity. Hydrochloric acid was found to be present at a very early stage under all pathological conditions ; but in all cancerous cases (proved to be such by post-mortem examination) it was only present in very small quantities, viz : 0. 1 per mille, about fifteen or twenty minutes after the meal, when in perfectly healthy persons the average amount is 0. 2 to 0. 4 per mille.

At the same period in hyperacidity the quantity of this acid was very much increased, viz: 1. 0 per mille. In both these cases lactic acid was found to be present at every stage. After introduction of pure carbo-hydrates into a fasting stomach (25 grammes of starch and 5 grammes of sugar boiled in 200 grammes of water,) the amount of hydrochloric acid was considerably less than after the test-meal above mentioned, both in normal and pathological conditions; even at the end of an hour only 0. 2 per mille of hydrochloric acid and the same quantity of lactic acid were discovered.

Finally, when pure luke warm decoction of starch was introduced into the stomach by a tube, any admixture of saliva being most carefully avoided, the hydrochloric acid production was quite moderate, and lactic acid present in about the same quantity.—*Gazzetta Medica Ital. Lombarda.* (?.)

WHAT THE CALIFORNIA DENTISTS WANT.

To the Members of the Southern California Odontological Society:—Your Committee on Dental Legislation beg leave to make the following report:

In pursuance of instructions given at your last meeting, the committee caused the arrest of several of the dentists practicing in violation of the law in this city. Through the misinterpretation of the law and other *legal* procedures no convictions were obtained. The most open and flagrant violations were instantly acquitted, and a trial by their *peers* seems to be as soft a thing as the non-graduate wants. And we, your committee, feel that the present law is but partially effective, inasmuch as a conviction will depend more upon the jury than upon the offense committed. California for years was the dumping-ground of eastern dental refuse. The passage of stringent laws governing the practice of dentistry in the Eastern States drove them from their native haunts, and California, with its many attractions and no dental law, was inundated with dentists. The passage of the dental act in 1885 has partially checked this flood of dental drift, and it will be noticed, upon examining the report of the State Board of Dental Examiners, that most of the applicants to practice have been graduates, and in this city, out of ten new (registered) dentists, seven are graduates, a very creditable showing Now that the intention of the law is to be defied, and that defiance to be based upon the verdict of a class of men whom this law was framed to protect and benefit seems indeed too bad. A law that will cause the dental profession to be better educated would be one of the most benificent imaginable, and we, your committee, would urge that a proper amendment be offered at the next session of our Legislature that shall completely close the back door and allow none to begin practice in this State without having first properly prepared himself, and we, your committee, deem graduation from some reputable college as absolutely necessary before beginning practice. The opponents of such a measure will strive to make out that we are endeavoring to create a monopoly and scheming to extort collosal bills from the bloated bondholder.

A few figures relative to the number of dentists to the population in California is very interesting to us, and furnishes food for reflection. The last report of the State Dental Examining Board shows 557 legally registered dentists, and to this number can be added at least forty more who are practicing without having registered, giving us one dentist to about 1,600 men, women and children. Eliminating the Chinese, it makes about one dentist to every 1,200 whites. Illinois, with three times our population, has only 925 dentists in practice. Wisconsin, with a third more people, shows but 357 dentists. Iowa has but one dentist to every 4,500 people, and the whole United States shows but one dentist to every 4,000. The editor of the *Dental Review* estimates that in 100 years more the dental profession will have increased so that there will be 400,000 dentists in practice, and the ratio will be one to every 2,500. Now, gentlemen, you will observe that we have passed the line and are trying to do what no other country in the world ever before attempted, viz., to support one dentist to every 1,200 to 1,500 people. It is not necessary to enter into a discussion of what the result will be. Every one must judge for himself and act accordingly.

The dental department of the University of California (which, by the way, is one of the best conducted dental schools in America) turns out per annum as many graduates as is needed to fill vacancies in this State, the average being about the same as the average per State throughout the Union. Our ranks are now full, and new recruits are sure to be added from the very highest order of dental practitioners, who have broken down in health in pursuit of their practice in eastern cities, and have come to this State in hopes of gaining our greatest blessing. This class of men usually seek the country, and it is not an unusual thing to find two or more located in towns of less than 1,000 population. They practice one, two or three days in the week, and attend to their orchards and vineyards the rest of time. And we feel justified in saying that nowhere in the whole United States can be found as many good dentists in small towns as can be found in California; in fact, they average higher than in the city. And now, gentlemen, we think we have shown that there is no good reason for leaving the back door open any longer. "Charity begins at homes," and we owe it to our students and the public that those who henceforth begin practice in this State shall be competent and have received the prescribed college degrees.

E. L. TOWNSEND,
J. M. WHITE, } Legislation Committee.
C. O. BALDWIN,

ERYTHROPHLEINE HYDROCHLORATE (MERCK.)

Erythrophleine is the alkaloid of erythrophleum-bark (Sassy-bark,) from *Erythrophleum Guineense Don,—Erythrophleum Judiciale Procter*. The tree belongs to the family of *Leguminosæ* and *Cæsalpiniaceæ*, and is indigenous to the coast of Africa, Senegambia, Sierra Leone, etc.

The experiments, carried out with Hydrochlorate of Erythropleine, by Drs. Harnack and Zabrocki, concerning its physiological properties, show a decided action on the heart (similar to that of Digitalis;) but at the same time it has a spasmodic effect; it produces convulsions such as picrotoxine would do, and this has so far forbidden its internal use. More important, however, than these discoveries, has proved a third effect, peculiar to this drug, for the discovery of which we are indebted to Dr. Lewin, Lecturer at the University of Berlin, who has experimented with Erythrophleine Hydrochlorate and has elicited for it much admiration in the medical world.

According to him, Erythrophleine Hydrochlorate Merck possesses local anæsthetic qualities similar to those of cocaine, and though anæsthesis would ensue some 15–20 minutes later than is the case with cocaine, it will be much more intense, lasting up to two days.

Dr. Lewin has experimented with Hydrochlorate of Erythrophleine (Solutions of 0.25 of 0. 1 and 0. 05) on rabbits, dogs, cats, etc., and has obtained a long-lasting and thorough anæsthesis of the cornea, conjunctiva, etc., without altering the size of the pupils.

Three drops of a 0. 1-$\frac{0}{0}$ solution introduced into the eye have been sufficient to produce a complete effect; the same strength of solution, injected subcutaneously has brought about thorough anesthesis, admitting of extensive manipulations on and near the spot of injection.

It appears to be impractible to use stronger solutions than the one indicated (0. 1$\frac{0}{0}$;) as otherwise irritations would invariably result.

Solutions should not be kept, but always prepared afresh.

There is no doubt that this preparation will prove a highly valuable and permanent addition to our materia medica. Such a valuable drug deserves to be universally tested, and details regarding its therapeutic effects may be expected ere long.—*Pacific Record.*

CHOLERA *vs.* MEDICAL COLLEGE COMMENCEMENTS.

In his address as President of the Chicago Medico-Legal Society, Dr. E. J. Doering said : " I question which is the greater public calamity, an occasional epidemic of cholera, or the regular, recurring annual epidemic of some 4,000 doctors let loose on an innocent and unsuspecting public. . . . The action of our diploma-mills, in adding each year thousands of young men to the ranks of a profession already filled and overflowing, is rapidly producing an army of genteel paupers, too proud to beg, too honest to steal, but too poor to exist. . . . . No reform can be expected from the colleges, for obvious reasons ; for, managed as they are, as private enterprises for business purposes solely, they naturally resist anything calculated to impair the very object for which they exist. As in a free country like ours it is unfortunately impossible to cause the 'professors' to be imprisoned at hard labor and the colleges to be burned down, we have to seek elsewhere for relief.—*Medical Record.*

LEGAL STATUS OF DENTISTRY IN ST. LOUIS.

The legal status of dentistry, which up to the present time has been to a certain extent a mooted question, has by a recent decision in one of the courts of our city, been pretty definitely settled.

By the "Scheme and Charter," the city is allowed to tax the professions, trades, etc., for the purpose of revenue. By a special act of the legislature, ministers, lawyers, medical practioners and teachers were exempt from this provision of the charter. Our city council not recognizing dentistry as a branch of medicine, or in any way exempted by this act of the legislature, passed an ordinance taxing dentists, with mechanics, etc. When an attempt was made to enforce the law, it was resisted by the dental profession, which resulted in a suit being brought by the city to enforce it. The following report of the case of The City *versus* Dr. William N. Conrad *et. al.*, shows the position taken by the profession in St. Louis on this question, and the argument made by the counsel for the defense. It will be of interest, especially to those located in cities where similar taxes are imposed :

City of St. Louis *vs.* William N. Conrad. Before his Honor Charles F. Cady, Police Justice 1st District Court, City of St. Louis.

Upon the calling of the case for trial, Selden P. Spencer, council for defendant, informed the court that by agreement the other cases pending would be continued, to abide the result in the case at bar, and then moved the court to quash the information ; that the ordinance under which the action was brought was in direct violation of the law of State, and that the mayor and the municipal assembly had exceeded their powers in attempting to make the ordinance a law, and to enforce it.

In substance the law of the State forbids the compelling of any person, who follows for a livihood the profession or calling of a doctor of medicine, to pay any municipal or other corporation any tax or license, of any description, for the priviledge of following or carrying on said profession or calling.

The city attempted, by an ordinance which defined a dentist to be one who performs surgical operations, or who advertises himself or herself to cure bodily diseases or ailments, generally or specially, to compel all dentists in the city to pay a license of ten dollars per annum. To sustain the point that dentists were practicing in a regular department of medicine, and as such could not be taxed under the laws of the State, Mr. Spencer called the attention of the court to the fact that the day had passed when dentists were looked upon as mere tooth-extractors or cavity-fillers ; that by law in this State, before one could practice in that department of medicine known as dentistry, he must thoroughly prepare himself in the fundamental principals of medical science : that in our schools and colleges of medicine those students whose purpose it was to practice in the department of dentistry, were compelled to fit themselves by a like course of study in the foundation principles of medicine with those whose future practice was to be general, or in some other department than that of dental surgery ; that the action of the American Medical Association at Chicago, and of the International

Medical Congress at Washington, whereby the department of dentistry, or of dental or oral surgery as it is sometimes called, was fully recognized and admitted as any other branch of the medical profession, was significant of the true position of this important department; that because one man devoted himself to the eye and was called an occulist, another to the ear and was named an aurist, and another to the teeth and was known as a dentist, he was no less practicing the profession of medicine though he chose to follow it specially rather than generally. And further, Mr. Spencer explained the true position of the profession to-day—how that their province was not only to treat the teeth in the many diseases common to them, but also to prescribe and care for any diseases of the oral cavity, and the diseases thereof were many and dangerous and difficult to control, often requiring surgical operations of the most delicate nature; that while the true relation of the special department of dentistry to the general practice of medicine had long been fully recognized and appreciated by eminent men within the practice thereof, it remained for this court to take notice judicially of this increasingly important branch of medical science, a step the more easy to take as the Legislature of this State, in its enactments regarding the profession of dentistry, had expressly classed them under the true head of "Medicine and Surgery." For these reasons the motion to quash the information, as being void on its face, was made.

After Mr. Spencer had concluded his remarks by calling the court's attention to the wording of the ordinance itself, wherein the definition of a dentist was as clear and emphatic a definition of a doctor of medicine as could be well given, the Court asked, "Has the city anything to say?" "Nothing," replied the city's attorney. "It is as clear as the noonday sun," continued the court. "The motion to quash is sustained." And the defendant was discharged. —*Archives of Dentistry.*

YOUR BATH—ITS TEMPERATURE.

Sea water externally applied as a bath is an important remedy. When the temperature is between 97° and 85° it constitutes a warm bath; when between 85° and 65° the tepid bath; and between 65° and 32° the cold bath.

The warm bath though below the animal heat, nevertheless produces a sensation of warmth, as its temperature is above that of the surface; it diminishes the frequency of the pulse, renders the respiration slower, lessens the heat of the body, and relaxes the skin. It cannot therefore be deemed a stimulant. By relieving certain diseased actions and states accompanied by morbid irritability, it often acts as a soothing remedy, producing a disposition to sleep. It is proper in feverish eruptions in which the pulse is frequent, the skin hot and dry, and the general condition characterized by restlessness. It is contra-indicated in diseases of the head and chest.

The tepid bath is not calculated to have much modifying influence on the heat of the body. Its peculiar effects are to soften and clean the skin and to promote insensible perspiration.

The cold bath acts differently according to its temperature and manner of application, and the condition of the system to which it is applied. When of low temperature and suddenly applied it acts primarily as a stimulant, by the sudden and rapid manner in which the caloric is abstracted. Next, as a tonic, by condensing the living fibres, and finally as a sedative. It is often useful in diseases of relaxation and debility when practiced by affusions or plungings, but it is essential to its efficacy and safety that the stock of vitality should be sufficient to create immediately after its use those feelings of warmth and invigoration included under the term reaction.—*Ditman.*

AN INTERNATIONAL DENTAL CONGRESS.

We disagree most emphatically with the views of the editor of *The Journal of the A. M. A.* when he says that "there is no interest, social, scientific or practical, to be promoted by an exclusively International Dental Congress in Paris next year, that could not be more efficiently promoted by a section of the International Medical Congress the following year at Berlin." There *are* interests, social, scientific and practical, why a dental congress should be held, why it should be held at Paris, and why it should be held in 1889. In the first place American dentists have not hitherto shown a disposition to cross the Atlantic under any and all pretexts. The dental section of the congress of 1881 was comparatively well attended, it being the first one organized; in 1884, however, the interest shown was so slight that the section was abandoned, and what less could have been done in 1887 at Washington, than the establishing of a section of dental and oral surgery? If in Great Britain a dental section was appropriate, how could the congress have met without one on the stamping grounds of Harris, Hayden, Flagg, McQuillen, Parmly and Webb, within a few hours distance of the first organized dental college in the world? Are there any of the conditions existing to make the dental section of the Berlin congress as successful as either the London or Washington congress, and are the possible results more favorable than those of Copenhagen? There is no certainty whether a dental section in the Berlin congress will be established or not, and dentists are by medical journals urged not to convene a dental congress, because possibly a dental section may be organized in 1890, and dentists may attend it. Aside from the inducements offered by attending a congress composed entirely of dentists, there are other reasons for selecting the time and place as suggested. The American Dental Society of Europe meets in Paris during the month of September, 1889, and the *grande féte* in the way of the Paris Exposition is promised as an additional inducement to undertake the journey. Hence, those who go will find a social feature and a scientific interest connected with the meeting of the American Dental Society of Europe — one of the best on the continent — which will be valuable indeed. For the promotion of practical interests a purely dental meeting is always superior to any other.

The real question at issue, however, is not in relation to any section of any medical organization, past, present, or future, but whether an International Dental Congress could benefit dentistry, and we invite an expression of all dental journals on this point, for a dental congress is sure to come, is certain to be well attended and its influence will be felt wherever dentistry is practiced.—*Dental Review.*

THE SALIVA, AND GASTRIC DIGESTION.

Dr. G. Sticker states that the notion that the salivary secretion plays no part in gastric digestion is erroneous. On the contrary, the presence of salvia in the stomach has a direct effect in promoting the secretion of gastric juice. The deduction was made from a case which presented a marked deficiency in the salivary secretion, and in which an examination of the contents of the stomach proved that the gastric juice was diminished in quantity, and proteolysis impaired. By administration of jaborandi, the salvia was increased in amount and the digestive powers restored. Since it is not known that this drug has any effect upon the secretion of gastric juice, it was inferred that the restoration of the latter was due to the entrance of salvia into the stomach. A simple experiment seemed to bear this out. The whites of three eggs were introduced into the stomach of a man, and the contents of the viscus withdrawn at the end of two hours. On one occasion he was forbidden to swallow salvia, and on another allowed to do so. It was found that in the first case, the stomach still contained intact albumen as well as undigested starch, and the gastric juice yielded a very feeble peptonizing power; whilst in the second, digestion had been entirely effected. That this result is not due to an assumed increase in peptogenic substances in the blood by the conversion of starch into dextrin, but to the direct influence of the saliva, was shown by witholding starch in the above experiment, when it was shown that albumen was normally digested so long as saliva was suffered to pass into the stomach. —*Forschritte der Medizin.*

IMPORTANCE OF ORDER.

The habit of order is much more far-reaching than is generally supposed. It governs all arrangements, those of time as well of place; it influences thought as well as action, character as well as conduct. It is the constant preventer of waste in every direction. No truly disorderly person can ever be economical. He may work hard and spend little, but economy demands the best results that can be obtained from any given source, and these can come only through orderly and systematic arrangements. The man has who acquired orderly habits will manage his time that it shall be fruitful. He will neither idly procrastinate nor hurriedly scramble through his work. He will neither put off to-day's duty until to-morrow nor force to-morrow's into to-day. He will provide for leisure as well as for action, for recreation as well as labor. He will respect the time of others as well as his own, neither breaking engagements nor forcing people to spend the time with him against their will.—*Exchange.*

Dr. W. Geo. Beers has been offered the lecturership on Dental Surgery in the medical department of McGill college, Montreal. The wisdom of the authorities is to be commended, and the doctor himself congratulated.

CONDUCTOR'S DEPARTMENT.

IN MEMORIUM.

Philo L. Stoddard, D. D. S., of Geneseo, N. Y., graduate of the Philadelphia Dental College, and son of P. K. Stoddard, M. D., of Prattsburg, N. Y., in the thirty-fourth year of his age, with consumption.

In the course of the Divine Providence our friend and brother has been removed from our midst during this past year, and it is with deep sorrow and regret that we are called to the painful duty of giving utterance to our grief at his loss and separation from us.

First, On account of his youth and bright prospects of present and future usefulness.

Second, On account of the lovely and interesting family he has left.

Thirdly, On our own account, as we can illy afford to spare one who had started out so manfully and well in his professional career, and had given such marked proof of future excellence.

His ambibition was not to get something to do, but to do well and perfectly his work. He had achieved, for a young man, a high professional standing, won by his urbane and gentlemanly bearing in professional gatherings, as well as by the quality of his operations.

Socially he was a warm friend, and had attained a desirable place in general society and among his professional friends and contemporaries.

WHEREAS, it is resolved by this Seventh District Dental Society, convened this 25th day of April, 1888, A. D., that we as an assembled body, do send our heartfelt sympathy and love to his parents and the bereaved members of his family and friends, and that a record of this resolution be placed on the books of this Society, and that copies of it be sent to his family and friends, and be published in one or more suitable journals, as this committee shall determine.

Respectfully submitted,

WILLIAM F. ARNOLD,
BOYD G. SAUNDERS, } Committee.
J. EDW. LINE,

Adopted at annual meeting of Seventh Society, April, 1888.

The Practical Dentist is the name of a new journal published by Dr. C. W. Munson, Toledo, and edited by Drs. W. E. Blakeney, New York, and F. O. Brake, Toledo. Monthly, one dollar per year.

ODD MINUTES.

The following occurs in a recent address to students by one of the best "all-around" men America has ever produced, Chauncey M. Depew:

"Acquire the habit of improving odd minutes. The majority of men employ the unavoidable waits between the scenes of our daily family drama, in preparing for either the idiot or the insane asylum. They do nothing, and think less, or get mad. They are the types of the friend you know so well who spoils the trip or party by storming first about, and then at the one who is the cause of the delay, or of the good deacon who responded to his pastor's earnest compliment that no matter who slept he was always awake and attentive. 'Yes, doctor, when you are preachin', I sits and thinks of nothing'.' The cause is always your sweetheart or your wife. Women are rarely prompt, and the reason is either the bonnet or the baby. Accept the inevitable as a special dispensation of Providence. Take up your book and read until she appears. Then do not swear nor rave, but compliment her cordially; she deserves it; and if you have the high privilege also kiss her, and you will both doubly enjoy the entertainment or the journey, and in time the things read during these intervals will prove a liberal education."

MARRIED.

Dr. William F. Arnold, of Rochester, and Miss Ella Warren, of Philadelphia, June 25th, 1888.

Dr. Arnold is Secretary of the Seventh Society, and will be doubly welcome on his return home and to his official duties. Several other members would do well to follow in his footsteps, and that quickly, too. The Seventh contains altogether too many bachelors. Next!

TO OUR EXCHANGES.

Direct copies of your journal to the Conductor of this periodical, at 26 E. Main Street, and if you fail to receive the ODONTOGRAPHIC JOURNAL promptly in return let him know, and the matter will be looked into forthwith. Please state if more than one copy is desired for journal purposes, and the street and number to which you wish it sent.

MAKING MOUNTS PHOTOGRAPHIC.

There is a phase of mounting which could well be impressed upon the attention of microscopists. That is, to make all mounts with reference not merely to use under the tube, but with reference to good photographic results. I think I am justified by experience and study in saying, what has been well said before, that whatever can be seen with an objective and eye-piece can be photographed as clearly as it can be seen, provided proper methods of preparation for photography are followed. I think it may be further stated that such methods of preparation will not diminish their value under the tube. Go through a cabinet of ordinary mounts and see how few are photographable! The enormity of the thing appears when we consider that nearly all classes of mounts, including opaque, may be readily photographed if properly prepared. To this, however, there are a few exceptions. The additions to general knowledge of matters microscopic which could be made, if all working microscopists would prepare with reference to photography, is simply enormous. —RAFTER, *American Monthly Microscopical Journal.*

CHICAGO DENTAL SOCIETY.

At the annual meeting held on Tuesday evening, April 3, 1888, the following persons were elected officers for the ensuing term:

President, J. A. Swasey; First Vice-President, J. W. Wassall; Second Vice-President, W. B. Ames; Recording Secretary, C. N. Johnson; Corresponding Secretary, Louis Ottofy; Treasurer, E. D. Swain; Librarian, A. W. Harlan; Executive Committee, Edmund Noyes, George H. Cushing, J. N. Crouse.

LOUIS OTTOFY, Corresponding Secretary.

PELLETS.

In the *Western Dental Journal* for May, friend Hungerford goes for everybody and everything with a recklessness that does one good to read. He is like an elephant in a tan yard, and as considerate of the feelings of others as that animal when in a rage. The boys had better keep on the other side of the fence for the present, working the knot-holes for a sight.

In the case of Dr. P. L. Stoddard, the Seventh society loses by death its first active member. This is a remarkable record for twenty years.

Dr. H. A. Parr, one of the most ingenious and skillful of crown and bridge workers, is a man of few words, but in those few words says what he means, means what he says, and is wonderfully prompt and effective in what he does. If you don't believe it, talk to him sometime when he's at home.

At a recent meeting of the Seventh society, Dr. Frank French said the first black rubber plate known to dentistry was made by Dr. Maurice Leyden, (then his partner) in the year 1866. It was made for a woman who had worn red rubber and whose mouth had off and on given her much trouble. Change of plate, however, wrought no change in the condition of the patient, "had no more effect than castor oil on a graven image."

The American Society of Microscopists will meet at Columbus, this year. The President, Prof. D. S. Kellicott, of Buffalo, is moving men and things to make the eleventh annual meeting the best of the series ; and he'll do it, if it can be done.

The Chicago College of Dental Surgery, one of the most vigorous of the lot, had 126 matriculants for the year just closed, and graduated 44 March 27th.

BOOKS, PAMPHLETS, ETC.

Student's Manual and Hand Book for the Dental Laboratory. By L. P. Haskell. Philadelphia : Welch Dental Company. Pp. 79.

This little work, by a practical dentist and terse writer, has been noticed elsewhere, and the notices read by all who are likely to see this. It seems to be just what the student most needs to jog his memory and thereby facilitate his work. The closing chapter of the volume is made up of extracts from Dr. E. H. Angel's Medical Congress paper on "Orthodontia, with a New System of Regulation and Retention," with numerous illustrations.

TRANSACTIONS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK, 1879, 1880, 1881.

This volume, known as the "lost" transactions, has at last assumed its proper place in the State Society's series of publications, thus enabling members and others who receive them to complete their files. An address or two and several papers got away during the Buffalo *Morning Express* fire of a few years since, and could not be duplicated by the authors; and these, with incidents of office practice and the discussions of papers which were purposely thrown out on account of age, do not appear. Otherwise the volume makes a creditable appearance after its long sleep.

Dr. George E. Fell's third case of "Forced Respiration" is described in detail in an eight-page pamphlet. The success of his apparatus completely nullifies Hall's objections to the use of such means of resuscitation.

The Woman's Journal is an illustrated monthly devoted to art, literature, biography, home science and woman's work. Ester P. Housh is its editor, and Frank E. Housh & Co., publishers, at Brattleboro, Vt.

Daily Paper for Our Little People, printed by the pupils in the classes in printing for the pupils of the institution and its numerous friends, is the name of a publication that circulates widely, and in its modest way tells the story of daily life at the Western New York Institution for Deaf Mutes. Prof. Z. F. Westervelt is principal, and with an able and enthusiastic corps of helpers has made the institution known and felt wherever ears are closed to sound and tongues refuse to speak.

The Druggist (St. Louis) has taken on new form and now makes a better appearance. Prof. H. M. Whelpley is the editor.

Dr. Ottolengui's "Anæsthetics, Physical and Psychical," is out in phamphlet form. Also Dr. Rhein's "Studies of Pyorrhea Alveolaris."

THE

Odontographic Journal.

VOLUME IX.—*October, 1888.*—*No. 3.*

IRREGULARITIES.

BY X. Y. Z.

[Read before the Minnesota State Dental Society, at Minneapolis.]

The subject I have selected is one which has never received the attention it deserves, either in our colleges or societies, and I think I am not far out of the way, when I say that the average dentist is less informed on this subject than upon any one branch of our profession. One cause for this is, perhaps, the great lack of system as taught by those who have written upon the subject.

Many refuse to treat cases of irregularity, claiming as an excuse that there is not sufficient remuneration for the amount of work necessary. True, it is work which at times is very taxing, but no part of our specialty has the tendency to make us more self-reliant or more fully develops our mechanical faculties.

I claim it is the duty of every one practising our profession, to be able to treat scientifically and intelligently at least the more common forms of irregularities.

I believe if the subject is properly understood, and everything being equal, we can treat these cases with as much success, and as little trouble to ourselves, and with quite as much remuneration, as we can the average class of cases with which the dentist has to deal.

This subject is so broad that I cannot, in the short time allowed me, do more than treat of it in a brief and general way. I will call attention to some points which are often overlooked, and point out some of the most common causes of failure, trusting to the discussion which will follow to, bring out everything of interest which I may omit.

If there is any rule which can be laid down with positiveness in the treatment of irregularities, it is that which prescribes timely and judicious extraction. Probably if every child could be under the care of a competent dentist during dentition, regulation appliances would rarely be needed; but, unfortunately, such is not the case. Our services are not called for generally until there is a well marked case of dental deformity which calls for mechanical treatment, often of a difficult and tedious nature, and which, perhaps, might have been wholly avoided by the simple operation of extracting a deciduous tooth at the proper time, and right here let me urge upon you the importance of impressing upon your patients the necessity of early and frequent inspection of the deciduous teeth.

In my opinion, the best time for treatment, everything considered, is the age of fifteen, though the time may vary according to the development and temperament of the child, ever having in mind that the earlier it is undertaken, the more easily it will be accomplished. But never undertake it until the tooth or teeth to be moved, and the anchor teeth, are fully erupted. And here let me discourage a popular idea that it is too late after the twenty-first year to undertake cases of this kind. I believe there is no limit as to time. Of course, the older the patient, the longer will be the time required for the absorbtion and redeposition of bone.

I have just finished a case where the patient's age was thirty-five, and all things considered, it was one of the most successful of any of the cases which I have yet treated. After deciding that mechanical treatment is necessary, and before choosing any definite plan of operation, take three careful impressions of the opposing teeth; make good and correct models of the same, and give each a thin coat of sandarac varnish. Give one of these models to the patient, that he may judge of the improvement as the treatment progresses. It is a reliable witness, and oft-times when the patient is tired, and, it may be, nearly discouraged, a comparison of the same with the original, will have a good effect. On the back of the second, write the name and age of the patient, together with the date. This one, after the articulation has been made, should be used for present study of the case and for future reference, and under no consideration should it be destroyed. Let me here recommend the careful preservation of the old models, as it is very interesting and instructive to occasionally look them over.

Upon the third model construct the appliances you wish to use. In deciding upon the method of treatment great care and judgment should be used. Take plenty of time, have your second model handy where you can study it during your leisure moments. Study it carefully; take plenty of time. I have often been surprised, after having nearly decided upon a course of action, by finding upon again looking at the model some new points before overlooked, which would greatly modify my plan of treatment. It is not pleasant to find, after we have got well under way in our treatment, that we have been too hasty, and have made a blunder, having, perhaps, caused unnecessary pain or delay, if not trouble irremediable. So I say, take plenty of time in deciding just what you ought to do, then go ahead and do it, finishing up each step as you proceed; but in the first place before beginning the treatment, it is well to have a plain talk with the patient, and, if possible, with those having him in charge, explaining as nearly as possible the probable expense and the amount of time and trouble connected with the treatment. Don't smooth it over to the patient and give him an idea that "life will be as on a bed of roses" during the treatment, and that pocket books won't suffer; but better let him be agreeably disappointed in the end than otherwise. Now, after a thorough understanding with the patient, unless you are convinced that he is in earnest and will carefully and systematically carry out your instructions to the letter, exercising courage and a due amount of patience, you had better stop right here and thank your lucky stars that you have been relieved of trouble and annoyance unspeakable. If possible, select the most favorable time of year; avoid extremes of temperature; spring and fall are the most suitable; observe system; see your patient once a day at a regular time—first thing in the morning preferred, thus avoiding interruptions during your regular work. Never attempt to bring the teeth into line if there is not sufficient room for them to occupy; space must first be provided. This is usually best accomplished by removing one or more teeth of the least importance, everything considered. It is *rarely* necessary to secure space by spreading the dental arch.

In deciding upon the forces to be used in correcting irregularities, I should advise the following:

First: That which will accomplish the work in the shortest possible time consistent with the laws of physiology.

Second: That causing the least annoyance to the patient both as regards comfort and appearance.

The first I regard as one of the greatest importance. One of the chief causes of failure is the unnecessary length of time often occupied in the treatment, oft-times both patient and dentist getting tired and disgusted long before completion. Study to avoid giving unnecessary pain, always remembering that our patients at best have much to bear. One unnecessary cause of pain, and a very common one, is interrupted pressure. As long as moderate pressure is applied constantly, but little pain or soreness will ensue. But if the tooth or teeth from any cause, such as breaking or changing the appliance, should be allowed to spring back, and pressure be applied again, great pain and soreness will result, which it may take days to control. This I believe to be the fruitful cause of the occasional death of the pulp during treatment. Any method of procedure which necessitates the frequent removal of the appliance is defective. Avoid as far as possible the use of unsightly appliances. In their construction, it is needless to say, that the greatest nicety and care should be observed, both as regards their fit and their finish. Every dentist should possess sufficient skill to construct his own appliances, or he will not prove very successful in the treatment of these cases. In the treatment of these cases, one or more of the five following movements of the teeth must be accomplished :

First : *Forward*, in the line of the arch.
Second : *Backward*, in the line of the arch.
Third : From *without*, into the line of the arch.
Fourth : From *within*, into the line of the arch.
Fifth : *Partial rotation* in the socket.

How may these movements be accomplished most easily and quickly ? From time to time many different contrivances have been brought out, prominent among which are the wedge, the lever, the inclined plane, the spring, the ligature (both silk and rubber), and the screw ; each and all possessing peculiar advantages ; and he who would be successful in the treatment of irregularities must be familiar with their respective virtues. In speaking of these various contrivances, it is not my intention to discuss the relative merits of each, as it would occupy too much of your valuable time. I will say, however, that of all those in use, probably no one has so little to recommend it as the inclined plane ; this should be, and to all practical purposes is, obsolete. The one force containing the most to recommend it is the screw, by which, in my opinion, more can be accomplished, if it is properly applied, than by any one of the others. It is simple and positive, enabling us to proceed with system and accuracy.

Dr. Farrar was the first to systematize its use, and he has probably done more to advance our knowledge upon this subject than any one else before or since ; but he has carried his principle so far, that to most dentists it is confusing and impracticable. The more simple and direct the application, the better it is. I find it necessary to use but five of the most important appliances, variously modified :

First : The *gripe* for drawing a tooth forward or backward in the line of the arch.

Second : The *loop* in connection with the *skeleton plate* for drawing a tooth from without into the line of the arch.

Third : The *jack screw* for pressing a tooth outward into the line of the arch.

Fourth : The *half loop* for partial rotation of the tooth in its socket.

Fifth : The *T screw* in connection with the *skeleton plate* where two teeth are to be drawn into line with partial rotation at the same time.

With these simple appliances I believe that almost any form of irregularity may be reduced far more speedily, causing less pain and annoyance than by any other method. In using the screw two points must be borne in mind, if you would be successful : *First*, the anchorage must be diffused over one or more teeth, so that sufficient power may be brought to bear directly upon the tooth or teeth we wish to move ; and *secondly*, the appliance must be adapted so perfectly that there will be no slipping or lost motion.

The screw should be tightened as often as necessary. The time varying, but usually once in twenty-four hours. After the teeth are drawn into the desired position, and a proper occlusion secured, take another careful impression of the teeth, from which, make a model, upon the back of which, write the patient's name, and time occupied in treatment. Give it a thin coat of sandarac varnish and lay it away for future reference. After this, the teeth should be held in position by any of the usual methods (the skeleton plate preferred, as it possesses the advantage that it may be removed and cleansed at any time), until they are sufficiently firm in the socket to remain without support in their place. Remember, that unless a proper occlusion is secured, the teeth will not remain long in their new position after their support is removed, hence the necessity of a good occlusion.

These five styles of the screw any dentist with a little experience can readily make ; the size, shape and strength should be, of course, modified to suit the case. In speaking of the jack screw, I do not mean the kind that is usually sold in the dental depots; they are large and clumsy. I prefer the spindle shape, as it is quite as powerful and much more compact, and far more readily adapted to use for which it is intended.

I make the screw out of Stubb's steel wire, the nut out of 20-carat gold, and the pipe, or base, of silver. It may be made of any size, the smallest I have yet made being three-eights inch in length. In its use, it is nearly always best to employ, in connection with it, the skeleton plate, in which case no pipe is used. This form of the screw is one of the most useful of the five principles and seems to be almost without limit in its application.

WASHINGTON AS AN EDUCATIONAL POINT.

BY W. W. B.

Washington city has many advantages as an educational point; and especially is this true to the would-be dentist, the physician or lawyer, as Washington has many and good schools of all three professions. I shall confine my observations in this short article, more to the educational advantages as seen from a dental standpoint, though a whole volume could be written of Washington and her many schools, colleges and seminaries. Every year Washington is becoming more of an art and educational centre. With its great Corcoran art gallery, and the magnificent bequest of its founder, the late W. W. Corcoran, establishing an art school; with its magnificent statues, fountains and edifices, Washington is destined to be the great art centre of the new world. Truly, the time is coming when, as one of the great European painters has said, "European students will some day come to the new America to study art."

Washington to the medical and dental student offers many advantages found in no other city in the world. He has free access to the libraries of Congress, the Army Medical Museum, the great National Museum, and the Smithsonian Institution.

The great Congressional library contains over 565,000 volumes, counting law books, which are kept in a separate library under the Supreme Court. The Toner medical library, numbering over 25,000 volumes, was added in 1882, having been presented to the United States by Dr. Joseph M. Toner of Washington. This collection is temporarily stored in a room under the rotunda of the capitol, and additions are made to it annually by Dr. Toner.

The Toner library is especially rich in early American medical literature, and has complete files of the early medical journals.

The library of the Surgeon General's office contains 100,000 books and an equal number of pamphlets, besides a nearly complete file of all the periodicals of the world devoted to medicine and the allied sciences. Students are allowed access to the Congressional library and the library of the Surgeon General's office, between 9 A. M. and 4 P. M. For the purpose of investigation, vertification of authorities and collateral reading, this library is invaluable. It contains many costly illustrated works in every department of medicine. The great museums offer many advantages, both to the medical and dental student. The Army Medical museum, situated on the Smthsonian grounds, contains one of the most complete collections of pathological specimens in the world. There is also a series of models and preparations by the best makers, illustrating normal human anatomy and embryology ; a most extensive collection of skulls and skeletons of North American Indians ; a large number of specimens illustrating diseases of the camp and hospital, as well as those occurring in private life—in all about 25,000 specimens. Additions are constantly made by the medical profession of the city and the officers of the army stationed at the various posts.

The United States National museum contains the most complete collection in the United States, illustrating the materia medica of the United States Pharmacopœia and those of other countries. The whole of this is arranged and classified in such a manner as to be immediately available for study.

The Museum of Hygiene is under the supervision of the surgeon general of the navy, and contains specimens of all forms of sanitary apparatus and hospital appliances. All the museums are open from 9 A. M. to 4 P. M.

The hospital advantages of Washington are excellent. They are in part or wholly supported by the government. Providence hospital, situated on Capitol Hill, corner Second and D. street, S. E., is a large general hospital containing 300 beds, and is supported in part by the general government. The transient poor are sent to its wards by order of the surgeon general of the army, and disabled seamen of all nationalties under the marine service are treated in the marine ward.

Freedman's hospital, situated corner of Fifth and Pomery street, N. W., is a large hospital containing 300 beds, supported by the general government ; all classes of patients are received without distinction of sex or color.

The Children's hospital, situated on W. street, N. W., between Twelfth and Thirteenth, is devoted to the diseases, injuries and deformities of children ; capacity, 80 beds.

Garfield Memorial hospital, Boundary street, between Tenth and Eleventh, N. W., is a general hospital of 32 beds.

The Central Dispensary and Emergency hospital, is situated on Twelfth street near F., N. W. A large proportion of the serious accident cases that occur in the city are first brought to this hospital on account of its central location. During the last year 7,157 patients were treated, and 259 surgical operations performed.

Columbia hospital for women and lying-in-asylum, is situated at the corner of Twenty-fifth and L. street, N. W.

All of the hospitals are open to students with proper restrictions, and clinics are given by professors in the different colleges.

One of the great advantages, peculiar only to Washington, is that the lectures at the different colleges are all delivered in the evening, from 5½ to 9½ P. M. This is true of all the medical, dental, and law schools in the district, the reason being that a large number of the students are government employees. The average office-holder has a mortal terror of waking up some morning and finding that his services are no longer required by Uncle Sam. He accordingly studies medicine, law or dentistry as a *dernier ressort.*

As a result, I venture the assertion that there are more M. D.'s in Washington than any other city of its size in the world. All have the same fever, from the $2,000 clerk to the janitor, and some of these graduates are "fearfully and wonderfully made." A great number of M. D.'s are government employees, with "office hours from 7 to 9 A. M., and after 4 P. M.," an easy and convenient way of paying house rent, as one M. D. confidentially informed me. At the present rate it will be but a short time before every office holder is a "doctor."

As the office hours of the government employee are from 9 A. M. to 4 P. M., he has an excellent opportunity to attend all lectures. But what an opportunity for the dental student, especially those of limited means, as here he can work in an office during the day and attend lectures during the evening. The young man who is economical and has some knowledge of dentistry can pay his entire expenses. The writer knows this is possible from practical experience.

A word for the colleges themselves. There are four colleges or universities ; all of these have law and medical schools, while three have dental departments.

The University of Georgetown is an institution older than the government itself. Besides a regular college course this university has a medical and law department. The medical department is situated in a magnificent new three-story building on H. street, between Ninth and Tenth, N. W.

The department is in its 40th session and offers many advantages. It has a faculty of eight professors with nine adjuncts of special departments, all well and favorably known men of the profession. Prof. G. L. Magruder is the dean.

The Columbian University comes next in age, and is certainly the most popular university in Washington. It has been heavily endowed at different times by the late W. W. Corcoran. Collegiate and professional instruction are given in four departments: The Columbian college, the National Medical college, the Columbian university law school, and the Corcoran scientific school. The medical building is situated on H. street, between Thirteenth and Fourteenth, N. W., and was the special gift of Mr. Corcoran. This is a large roomy building, and has recently been remodeled in keeping with the times. The medical department proper consists of a faculty of seven professors, with nine adjuncts of special subjects for the spring course.

This is one of the oldest and best known medical colleges in the country, being in its sixty-seventh session. The dental department of Columbian university was established in 1887, and is therefore in its second session. The dental department has a faculty of seven professors, all of whom are well and favorably known in their profession. The infirmary is well lighted and supplied with Morrison chairs. Prof. A. F. A. King is the dean.

Howard university was established by Major-General O. O. Howard, at the time a Senator from Maine. This university, besides a regular collegiate course, has theological, medical, and law departments. The medical department, situated on Pomery street, near Fifth, N. W., has a splendid large four-story edifice, and is in its twenty-first session. The medical department includes dental and pharmaceutical departments; the medical faculty proper, consists of seven professors. The dental department is in its fifth year, and has a faculty of six professors, all of whom are of the best men in the district. Prof. J. F. R. Dufour presides over the dental department, and is one of Virginia's old-fashioned gentlemen, growing scarcer every year.

The medical department of Howard university is one of the most popular schools, the medical class of '87 being the largest in the district. Freedman's hospital is situated immediately adjoining and furnishes superior hospital advantages. Prof. Thomas B. Hood is the dean.

National university has a law and a medical department. The law department is in its twentieth year. The medical department is situated on K. street corner of 8th, N. W., and is in its fifth session. The medical faculty consists of seven professors, with seven lecturers on special subjects. The dental department of National university is in its fifth session, and has a faculty of eight professors, all of whom are well and favorably known in the profession. The world famous and venerable Dr. Edward Maynard, is professor of theory and practice of dentistry. The diplomas of this institution are signed by the President of the United States, who is chancellor *ex-officio.*

All of the schools conform to the rules of the National Association of Dental Examiners, and are yearly elevating the standard of requirements.

The clinical advantages, while not up to those found in our larger cities, are good, the number of patients exceeding the accommodations. The infirmaries are open for the reception of patients from 1 to 5 P. M.

Quite a number of German students attend Washington dental schools, and for the reason that the average German has an ever-increasing reverence for anything supported or sanctioned by government.

It is an amusing sight to see the material presented in an average medical class. What a treat for the character reader. Among the students attending one of the Washington medical schools, the writer noticed an aged colored clergyman, and was naturally surprised that a man of his age and profession should desire to engage in the study of medicine. The writer asked if he ever intended to follow medicine as a profession: "God forbid! my son; for me the study of medicine is a necessity. I am getting to be an old man; have been nearly forty years preaching the gospel. There is coming a time when I will not be able to preach; then a younger man will take my place and I'll be turned into the street. I have seen too many old preachers going through the streets of Washington, begging for the bread they ate. I am studying medicine that I may support myself when I can no longer fill a pulpit." Students of all ages, nationalties and temperaments, every man imagines he has some special gift that places him above his fellows in the study of his chosen profession. The old man of sixty, the stripling of twenty, sit side by side, one pitying the youthfulness of his companion, the other looking with concern at the aged appearance of his fellow, but both doing their best to master the subject in hand.

The winters of Washington are mild but changeable. The many boarding houses offer superior accommodations at as low a price as can be found in any of our larger cities. No more delightful place could be selected to spend a college term than Washington, with its magnificent streets and edifices, its parks, fountains, and its statues of the old war heroes.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

Reported BJONES DESMITH, D. D. S.

In the discussion of that part of the report on practice relating to implantation, Dr. Atkinson said that when a new socket was adapted to receive an implanted tooth, it didn't need other support. When one side of the socket was deficient, he would properly support it. Sharp mechanical dentists should measure so as to have the socket equal in strength on all sides, if possible.

Dr. Jackson asked what he meant by "mechanical" union, to which Dr. Atkinson replied that everything tends towards crystalization, and to say "mechanical" union was wrong; but "chemical" union correct. There was such a thing as the mechanics of chemistry.

Again, any man who would use an edge for pushing, pulling or scraping, should be prayed with. Any one who would use a Riggs' instrument needed commiseration. The edge cut a concave ditch through the deposit. They should pull the deposit off, not tear it. Every stroke of the instrument tore off a part of the tooth, and then they had broken fibres into which the lime particles had been driven. All scraping was pushing, if it went from the hand only. All scraping that came towards one was pulling; but the point was, if they would persist in attempts at using Riggs' instruments, to make a change in the point—an edge that was no edge. He didn't know anybody delicate enough in this manipulation to use a sharp instrument for scaling without doing damage.

Whenever a tooth was so loose that it required some sort of support, it should be done with whatever would best answer that end.

An attempt to clean a loose tooth should never be made, unless they had got it in position and held firmly by means of silk. If one layer was sufficient, all right ; if not, another should be put half-way up or half-way down, holding the tooth so firmly that it would bear mechanical action. He thought most of the cases of pyorrhea alveolaris had been in teeth that " warbled." Teeth should be made firm, made to occlude properly, and then cleansed.

Dr. Ottolengui combatted the idea that loose teeth, to be made firm in the jaw, must be held firmly in place by some appliance until tightness became a fact.

He said also that it was a significant fact, that anything once proven possible, was proven possible beyond a doubt, and no amount of failure could prove it impossible. Once accomplished it was accomplished for all time. If on teeth connective tissue had formed, it proved that under favorable conditions connective tissue could be formed again. Much depended on the condition of the teeth put in and of the mouth into which the teeth were put. He had implanted a bicuspid for a lady, and while he thought it would finally be a success, it was not yet firm as he would like to see it. Two weeks later he had removed a cuspid from that same mouth because of irregularity. He had drilled a new socket and placed that same tooth in position, because that tooth necessarily had an affinity for that particular mouth. That tooth was in as perfect a condition as though it had never been taken out.

Dr. Curtis thought implantation of teeth should be looked at from a scientific standpoint, and that there should be most careful and thorough research. If we were looking for the best and most favorable results, we could get them only from the best resources we had. Many failures he believed to be due to the old periosteum left on the tooth. Dr. Younger had made that a strong point in his early writings, that it should not be disturbed, but left to be revitalized, and to afford attachment to the bone. He believed that to be one of the causes of failure in transplantation and replantation. Why should they leave a poisonous substance in replantation or implantation ? All that should be carefully removed and nothing but the cementum permitted to remain.

Dr. Atkinson asked if Dr. Curtis would remove it if healthy.

Dr. Curtis said he meant that a portion of it was dead, and if replaced in the socket would prove a disturbing element.

Dr. Ottolingui wanted to know if he would use a tooth from which the gum had receded.

Dr. Curtis thought they should not use in any case a tooth that had been affected by any disease whatever. He thought they should look for a healthy and normal condition in both the mouth and the teeth to be implanted. He also believed it important that they should have freshly extracted teeth, because in that case they had the tissues living.

The President called on Dr. Watkins, of New Jersey.

Dr. Watkins said the State of New Jersey was not expected to know very much, yet they had endeavored to hold their end up. He wanted to say a word about amalgam. The report said that no better filling could be made with copper than with high grade amalgam, therefore the chairman would prefer a high grade amalgam in all cases where amalgam was desirable. He would take issue on that point. He had used copper to some extent, and didn't think there was any other material equal to it for filling certain kinds of cavities. He had reference to its saving qualities, wherein it was king. Its only fault was in its color, which he did not think worthy of consideration at all. He didn't see any sense in using gutta-percha in buccal cavities in third molars. He could use copper there, and knew it would last. Put gutta-percha into temporary teeth and it lasted but a little while and became offensive. Put in an amalgam and the walls break away or the amalgam contracted, and there was a space between the tooth and filling. With copper amalgam that was not the case. It seemed to have antiseptic properties about it that would save of itself and harden the tooth substance. It was just as easy to work as anything else to be found ; easier than gutta-percha, easier than any other amalgam. It required little pressure to work it. One could take a perfect impression of even the lines on one's fingers. It did him good to see amalgam fillings of that kind—to see how strong they were, how perfectly adapted to the purpose. It seemed to be adhesive during the manipulation, and when it became hard one had the best filling it was possible to obtain. The more it was ground the more paste-like it became. He had heard some condemn it because it wasn't pasty. That was not the case. The more they worked it, the more paste-like it became, so that it would draw out like a piece of gum. It was, in comparison to other amalgams, what wrought iron was to cast. It was tough.

Dr. Rhein was very much gratified by the discussion the report had brought out, but the criticism of his efforts had not convinced him that he was wrong in any case cited. He disputed Dr. Atkinson as to the intent and purpose of connective tissue formation, and corrected Dr. Ottolingui's description of one of the cases of transplantation under discussion.

He denied having said better fillings could be made with high grade alloys than with copper, but that as good could be made. He could produce a perfect amalgam filling, but it required more skill than gold. If he could save teeth with a light colored amalgam, he could see no reason for using copper. He did not believe in scraping roots where it could be avoided—if he could remove the deposit without scraping. If it is impossible to remove it by other than scraping, scrape. He meant by "pushing" and "pulling," to include scraping where necessary. He did not approve of Riggs' form of instruments.

Dr. Mirick moved that a committee of one member from each district be appointed to nominate permanent members.

The President named as such committee the Board of Censors.

Dr. Line moved that the report of the committee on practice be given the *Dental Review* for publication, which was in accordance with the expressed wish of the chairman.

Dr. Walker hoped the report would not be published unless a report of the discussion was published at the same time. There were many journals that would publish the report, but would not give room to the discussion.

Dr. Rhein was opposed to any journal publishing it, unless it gave all the discussion in one number.

After some further discussion, the matter was left to the discretion of the chairman of the committee.

EVENING SESSION.

The President called upon Dr. Ottolingui, of New York, who read a paper entitled "The Esoteric Law of Cure," the concluding part of which appeared in your July number.

In the discussion of the paper, Dr. Atkinson said the idea of knowledge that had been received from without in place of from within, had been clearly set forth by the essayist, both as to its exoteric phase and esoteric elaboration or gestation. They had heard a beautiful synopsis of what had been called the cause of individual being, which had never been solved to his mind anywhere outside of the realm of mental activity, and that was the purely spiritual condition of entity and the multiples of entity. All conclusions based upon such a foundation were the absolute truth ; they were exoteric, and open for everybody to see. The esoteric were those that had been held by the illuminati, to be given only to the initiates, and it was something we knew so little about as to simply wonder at it. To take up the different phases of esoteric knowledge and try to get the ideas, would be like taking up different books in the hope of understanding the many peculiarities of the languages in which they had been written, and after that resolving each back into its own individual language. They had the words of the English language so twisted that one had to read forty lines to get one truth. When they said " That is true " or " That is false," they should be modest, and say it only according to the measure of their own intellect.

The whole field was open to the inhabitants of this planet, but there was too much involved in it. Take the idea " I am that I am." They forgot that anything that could say " I am " had never had a beginning, nor could it have an end. The essayist said the ideal had come from the sources of successive generations. Take up histological research, and they would learn through little things what the great fraternity upon this planet meant. Take the evolution of sentient beings upon this planet, and they would see that there was, as the paper had suggested, a start from the ovum. The same ovarium brought forth the same kind, in long time or short time. It resolved itself back again into the fact that it was the movement of the intellect that we called consciousness ; that was esoteric, and none of us had seen the vail of the temple rent in twain so that we could get at the Shekinah in understandable shape.

An amended motion referred the bill of Matthews, Northrup & Co., of Buffalo, to Dr. A. P. Southwick, with authority to settle on terms satisfactory to those concerned.

Election of officers resulted as follows, Drs. Hart, Mills and Jewell acting as tellers :

President,—J. Edw. Line, Rochester, N. Y.
Vice-President,—C. F. Rich, Saratoga, N. Y.
Secretary,—M. D. Jewell, Richfield Springs, N. Y.
Treasurer,—H. G. Mirick, Brooklyn, N. Y.
Correspondent,—G. L. Curtis, Syracuse, N. Y.

An election of Censors resulted in the choice of Dr. Jarvie for the Second District, and Dr. Palmer for the Fifth.

The committee to nominate permanent members, reported for the First District, A. R. Starr ; Second District, J. H. Holley ; Third District, P. S. Garvey ; Fifth District, A. Retter ; Seventh District, W. A. White.

The report was accepted, and the gentlemen named elected.

SECOND DAY—MORNING SESSION.

The President read a telegram from the Illinois state dental society, then in session at Cairo, expressing their interest in the continued success of the N. Y. society.

On motion, greetings were wired in return.

Under the head of Incidents of Office Practice, Dr. Jarvie exhibited a little drill. They had had a number of drills for enlarging pulp canals, but he had never yet seen a drill that he would be willing to use in a buccal root of a superior molar, or the small roots of a first bi-cuspid which he had found upon examination at all crooked, for fear of cutting through the side. He knew that some had contended that they could enlarge a pulp canal with some drills to the extreme end. In this he saw for the first time a drill that commended itself to him for the purpose in question. It had been shown him by Dr. Osborne of Orange. It was made of No. 0. piano wire—very thin, not larger than a thread of cotton—yet the wire was so hard that it would cut dentine without tempering, and as flexible as the best platinum wire. For perhaps one-eighth of an inch from the end of the drill it was made three-sided.

While on his feet he wanted to call attention to an interdental splint, a most valuable improvement in these devices, by Dr. Burns, of Fairport.

Dr. Starr described a method of inserting the Logan crown to secure a better joint than was usually obtained in the ordinary manner of setting, particularly in roots decayed on the lingual aspect. He prepared the crown and root without at first being particular about the joint between the two, preparing the interior of the root dovetail if necessary, and inserting the crown with cement. When that had hardened, he cut away some of the cement from the lingual portion, replacing it with amalgam. If amalgam was not wanted, he cut away the root at the juncture of root and crown and filled with gold. When the root was decayed all around, he used amalgam alone, filling part first and the rest at another sitting.

Dr. Carr showed a little spring joint that would prevent the breaking of cables in the engine.

Dr. Jarvie presented a model of a case of implantation, performed a year before by Dr. Younger. He had spoken of a case then that had been operated upon some six months previous, which a few days after the operation, was as near a failure as possible, and yet by care and keeping the tooth fixed in position it, at that time, looked like a success. He had made a model, simply to show the perfect condition and perfect formation of gum at the neck of the tooth.

Dr. Mirick had seen this operation performed by Dr. Younger, and had always felt an interest in it. It was a most successful operation; as successful as could possibly have been made. It had struck him that the color conformed to that of the other teeth.

Dr. Brown was a little outside of New York and Brooklyn, but believed it the duty of every member to bring in anything of interest. Seventeen years before he had published an article describing a way of retaining porcelain fillings in the sides of incisors, and at that time, nine men out of ten said the operations were failures. He had there the first specimen he had been able to get that would illustrate the practical value of what he had claimed—the dove-tailed corner for holding the slabs on.

Dr. Pinney spoke of a little case of jaw fracture which he had in hand. It was a child of twenty months' old that had been run over in the street, and its jaw broken between the laterals and cuspids. It was doing well. He had made use of the splint shown by Dr. Williams at the First district society a year before.

Dr. Jewell presented an excessive deposit of calcarious matter upon a lower molar.

Dr. Green presented a case of bridge-work. Any man who would form an opinion and condemn bridge-work from such a case as that was a good dentist. The piece had been attached to a lower first bi-cuspid, the second and the molars had been extracted, leaving this one tooth to do the work of four.

Dr. Littig didn't know that the piece in question should be called bridge-work at all. He didn't know how they could make a bridge without at least two abutments.

Dr. Curtis said it was a swing-bridge.

Dr. Jewell called it a draw-bridge; it had drawn funds out of the pocket of the patient.

Dr. Atkinson then read "What Lack I Yet," which may be found in full in the July *Odontographic Journal.*

Dr. Ottolingui agreed with everything Dr. Atkinson had said and rose to speak for and emphasize some portions of the paper. We had what we called a code of ethics, which meant laws which affected our body in our practice. He thought they were openly violated by few, but many more broke those laws privately. There was nothing a man should be more careful about than criticising work done by others. We could not know the conditions under which the work had been accomplished or what had passed since to bring about the conditions in question. There might be cases where the work had been so badly done as to make it necessary to point out its faults, but many were too apt to do it.. He cited a case in his own experience, and said that when he had entered the employ of a certain dentist, he had been obliged to conform his actions to the rules of his employer, one of whose rules had ever been—Never criticise work in a patient's mouth—never say that the man had done improperly. He had formed the habit of not criticising work done by others. They were not infallible and could always perform the same kind of work in the same manner. They were not machines, and even machines did not always perform the same work in the same way. A bad piece of work does not necessarily prove the man a bad practitioner. He had had a patient come to him some years before on account of the removal of her regular dentist to another state. He had worked for her ever since. A year before she had fallen into the hands of her old dentist—a first class, good, old-fashioned practitioner. At her request he had examined her mouth and pointed out a filling which was "in a terrible condition and no credit to the man who had put it in." That patient had come back to him much out of sorts. He examined the tooth and found the filling leaking, and being unable to swear that he had not done it, and willing to admit a failure, he replaced the filling without charge. In justice to himself he tried to find out who had made the filling, and found that it had been put in ten years before by the very dentist who had criticised it. Other members of the same family were patients of that dentist, and this had been discussed in her family and had gone out among her friends. They could not tell where their criticisms as dentists would go. They should all be very careful how they criticised the work of other practitioners.

Dr. Brown thought we needed a dental law to protect Dr. Ottolingui—a law to provide that such men should not replace other men's fillings free of charge. He kept a system of books—and had for some years—that made it impossible for him to do any such thing as that. He used such terms as any one could understand, and when a patient came into his office and said "I think one of your fillings is out," before he looked into that mouth he brought out his bible—his ledger. While the book was open before the patient he looked at the tooth, and there was no chance for dispute. If it was his filling and had been in for ten years he got a good fair price; if five years a less price. If it was not his he got double the price, which he would not have asked if the patient had not been too well satisfied that it was his filling.

Dr. Green always made a diagram. When he presented the bill an exact copy of that diagram was given, with the number of teeth filled and what they had been filled with. The patient did not have to read it,—he saw picture of his own mouth.

Dr. Rhein thought the diagram was undoubtedly the best method of keeping a record of work in case of future necessity, but it was about time that the giving of a detailed statement of work to our patients was stopped. If we were selling a pound of butter or a dozen of eggs, it might do to furnish every one with a detailed statement. To mark a filling here and a filling there did not agree with his view of professional services. It gave patients an opportunity of forming a judgment of professional services which they were incapable of forming correctly or understandingly.

Dr. Curtis liked the dignified manner in which Dr. Rhein conducted his practice. He thought the diagram should be wholly for their personal use and not for that of the patient. He thought the more dignified manner in which they conducted their practice the better for the profession at large.

THE TREATMENT OF PYORRHŒA ALVEOLARIS, OR INFECTIOUS ALVEOLITIS.

The subject of my paper is a disease of the dental sockets which it has been customary to name alveolar blennorrhœa. Hitherto so little has been postively known of the essential character of this peculiar affection that it will surprise no one that we are in the dark both as to its causes and its treatment.

If we follow step by step the clinical phenomena of the disease, which so far I have only observed in well-developed jaws with sound teeth, we notice the following essential appearances :—At some spot in the row of permanent teeth, one of the processes of gum, which is normally found as firm tissue filling up the space between the necks of the teeth, is seen to be somewhat retracted and everted as it were. If the affection, which is a serious one, whatever variety of tooth it attacks, begins between two incisors, we find on examination of the mouth the space between the central and lateral incisor filled by a healthy process of gum tissue, while on the other side, we see the first sign of commencing alveolitis, namely, disappearance of the process of gum, and in consequence a free space between the necks of the teeth. This disappearance of the process of gum between the teeth is the first pathognomonic symptom of the disease under discussion. The gum itself at first presents no inflammatory swelling ; its color is normal, and all that we find is a looseness of the ring of gum which normally surrounds the neck of the tooth like a sphincter.

If, now, we pass a fine excavator under the everted margin of gum, we find, with few exceptions, on the approximal surfaces of the necks of the teeth small acuminate deposits of concretion of a greenish-black colour, by which the adjacent margin of gum has been thrown into a state of chronic inflammation. Later on we find the gum somewhat lifted up from the neck of the tooth by these deposits, so as to form a sort of *pocket, from which a dirty purulent secretion exudes on pressure* (Pyorrhœa). On probing this pocket we find the border of alveolus between the necks of the teeth rough and denuded of periosteum, and from an examination of jaws which have been macerated, it is evident that even at this early stage of alveolitis the affected alveolar border has already lost its covering lamella and has become quite porous.

We see the rough concretions on the neck of the tooth, which have been deposited close to the alveolar border, and have separated the gum from the neck of the tooth. In the pocket thus formed the products of decompostion collect, the periosteum of the alveolar border is destroyed, and the edges of the latter undergo necrosis. It is further to be observed that the submucous connection between the gum and the periosteum of the aveolus is also, as a rule, destroyed, so that the socket becomes necrosed on both sides at once.

At the very commencement of the disease the teeth belonging to the sockets affected by it appear *somewhat loosened ;* and the further the process advances the looser they become, until they are at length completely extruded by the granulation tissue which grows from the enlarged cancelli of the diseased portions of bone.

During this process, which mostly runs a chronic course, the *periosteum of the root of the tooth* becomes disintegrated from the neck of the tooth to its very apex ; but, like the gum itself, it takes but little part in the formation of pus, usually so copiously poured out in this disease. The *source* of the *pus* is rather to be looked for in the medullary substance of the ring of the bone surrounding the neck of the tooth, for if the alveolus be examined at the moment of extraction, and before it has become filled with blood, the diseased portion of bone will be seen covered with pus and soft granulations. I have frequently found this soft connective-tissue neoplasm very abundantly developed on the interalveolar walls of the upper and lower molars, where it occurs in the form of lobules on the more or less disintegrated portions of alveolus separating the fangs. It is also sometimes found after extraction on the tooth between its roots. It is not until the process has penetrated to the bottom of the alveolus and the tooth is quite loose that we find this granulation tissue also occupying the base of the socket. In this case the growth of granulations from the medullary tissue at the root of the tooth leads to a breaking down of the cementum, as a result of which the apex of the tooth is seen to be quite rough. I have not yet observed the total disintegration of the layer of cementum which Magitót has described as characteristic of the disease.

As a rule, the patients will not allow you to extract the affected teeth until they have become quite loose ; but if you should ever chance to extract a tooth at the early stage of the disease, you will find the soft disorganisation of the dental periosteum confined to the neck of the tooth. The remaining portions of it are velvet-like and loosened, and present a brillaint vascular injection increasing towards the root, and associated with small nodules and lobular granulations. I have not yet examined theses growths for nests of micrococci, but I have no doubt that they are to be found, not only in the granulations, but also in the infected medullary tissue of the interalveolar partition. In the pus which may be obtained from the affected alveoli by pressing the gum we observe under the microscope a countless number of micrococci and bacteria, which doubtless find in the pockets of gum tissue *the most favorable conditions for their development.*

The pulp appears to me to be involved in this affection only secondarily. The earliest changes in it bear some resemblance to the net-like atrophy prescribed by Wedl. At first the larger vessels are seen to be congested, and there are deposits of lime salts in the pulp tissue. It is not until later, when the disorganisation of the alveolus has reached the end of the fang, that the pulp of the *now entirely loosened tooth* breaks down into a fetid fluid mass. In single cases, however, I have found pulps inflamed and gangrenous, even before the teeth had become fully loosened. This has chiefly occurred in the case of younger patients, in whom the disease ran an acute and not a chronic course ; the teeth became loose a few weeks after they were first attacked, they grew sensitive on mastication and to heat, and generally had to be extracted from the affected sockets after they had caused the patient several sleepless nights.

I was very much struck in some of these cases with the fearful pains which the patients complained of, as well as with the phenomena with which the suffering was associated. I have repeatedly observed high fever, rigors, hard phlegmonous swelling of the side of the face and sudden formation of abscess under the gum. When teeth are attacked in this way their periosteum becomes in great part disintegrated and covered by a fetid ichor, which continues to pour itself out of the abscess after the extraction of the teeth, which I may add, are usually free from caries.

The causes of this affection, the first symptoms of which are invariably overlooked by the patient, and were until lately too little regarded by the dentist, are still more or less unknown. Neglect of the teeth encourages it, and also, more particularly, the deposit of concretions on the necks of teeth, by means of which the gum is lifted up from them.

The usual deposits of tartar with which we are all familiar are firmly attached to the neck of the tooth *upon* the margin of the gum, which is gradually mechanically pressed down from the neck of the tooth towards the fang by the gradual increase of the chalky concretion ; the alveolus and its covering disappear, but simply from atrophy through pressure. But in this process, which is one of very slow progress, the connection between the gum and the periosteum of the jaw and the alveoli remains unbroken ; it is a localised process, as may be observed in those cases in which it so frequently occurs in connection with incrustations of tartar on the lower incisors.

The greenish-black concretions, on the other hand, always form on the neck of the tooth *beneath* the gum close to the inter-alveolar wall, and by their gradual growth destroy the connection of the gum with the periosteum of the jaw and teeth.

I have hitherto been unable to find any definite point of contact between alveolitis and constitutional affections ; it appears to me, however, that prolonged residence in damp dwellings favors its occurrence. Other causes are to be found in various affections of the gum, which lead to a collection of irritating substances between the gum and neck of the teeth. Among the sailors of Heligoland, not one of whom has probably ever used a tooth-brush, almost two-thirds lose their teeth at a very early age from alveolar pyorrhœa, which, however, in this case is always associated with spongy softening of the gum.

As a general rule, then, it may be accepted that any affection of the gum that arises from want of cleanliness may in the end give rise to a considerable softening and loosening of the gum from the neck of the tooth, and so prove an indirect factor in the causation of alveolar pyorrhœa. Nevertheless, it is necessary to insist upon the different course run by simple affections of the gum as compared with that of infectious alveolitis. Simple gingivitis and ulcerative stomatitis can both be easily and thoroughly cured as soon as the necks of the teeth are cleansed of mucus and tartar, the ulcerous edges of gum cauterised with chloride of zinc or carbolic acid, and the teeth and gum carefully cleansed by the patient with a soft brush and carbolised spirit. In these cases teeth become considerably loosened, as we have sometimes seen in cases of ulcerative stomatitis, without being lost; but here, as in the case of all affections of the gum, the loosening is invariably a secondary result, and as soon as the gum grows healthy the teeth again become fast in their sockets.

Now, if the disease we are discussing were a simple blennorrhœa of the gum, it could, like other gingival affections, be easily cured without loss of teeth. This, however, as I have learned from my own experience, is not the case, and on this ground it is necessary to draw a distinction between the disease of the alveoli which is the subject of this paper and diseases of the gum, though I am free to admit that neglect to cleanse the gum often enough gives rise to the former affection.

We have, in fact, to deal neither with an ulceration of the gum nor with a primary inflammation of the dental periosteum, but with a molecular necrosis of the alveoli, or caries of the dental sockets, produced by septic irritation of the medulla of the bone.

The affection is not to be confounded with senile atrophy of the alveoli. On the contrary, it occurs most frequently in strong and healthy persons in middle life, and, according to my observations, seldom, I might almost say never, attacks carious teeth with diseased pulps. Senile atrophy consists in a steady disappearance of the socket, by means of which the fangs or the teeth are gradually laid bare; there is no necrosis of the alveolar margin, and the gum remains firmly attached to the latter and to the periosteum of the jaw. In alveolar pyorrhœa, on the other hand, there is, as already mentioned, a loosening of the gum from the outer border of the alveolus, by means of which the periosteum of the latter becomes exposed and destroyed by colonies of micrococci, while the margin of bone, thus robbed of its covering, is infected and finally becomes softened by caries.

Alveolitis is a disease which—exactly as we might expect from the cause that gives rise to it—attacks first by preference the *strong inter-alveolar partition*, and it is a distinct error of observation to maintain that it chiefly affects the labial lamella of the alveoli, or that it is more frequently found in connection with teeth with a single fang than with the molars or bicuspids. I have often seen the affection occurring in young persons, between the ages of twenty-five and thirty years, where senile atrophy of the alveolar process was certainly quite out of the question, and I have seen it attacking the most different kinds of teeth. I have observed its commencement both on the upper and lower wisdom teeth, and also on the bicuspids and incisors; but it invariably happened that the starting-point of the disease was in *one* inter-alveolar partition.

An affection resembling alveolar pyorrhœa is observed in the eruption of the lower wisdom teeth, if they happen to be dislocated backwards and remain beneath the gum for a prolonged period. In this case also putrefactive products collect between the neck of the tooth and the gum covering it; and the mechanical injury to which the swollen mucous fold at the angle of the jaw is exposed, together with the septic irritant which is conducted from the pocket of the gum to the alveolar border, lead to those violent inflammations of the angle of the jaw which we know so well in practice.

The cause of this inflammation is thus similar to that which produces alveolar pyorrhœa, but the course of the two affections is utterly different. If the wisdom tooth is extracted before it has led to extensive inflammation of the jaw-bone, the affected alveolus heals up, and the loosened neighboring tooth, the socket of which has been more or less involved in the inflammation and undergone some degree of softening, again becomes fast, and that even though the inflammation has run a chronic course, and the misplaced tooth is not removed for years.

In these cases, if we examine the enlarged alveolus and the periosteum of the root of the wisdom tooth, we find almost the identical changes which are observed in teeth with commencing alveolar pyorrhœa; and yet the inflammatory process that occurs in the case of eruption of a wisdom tooth remains confined to the one alveolus, and the adjacent tooth continues firm, while infectious alveolitis speedily attacks the contiguous alveoli, and causes the loss of the teeth they contain.

I have dwelt on this comparison with the view of showing that in alveolar pyorrhœa there is a certain something co-operating, either a *predisposition* on the part of the alveoli, or, as to me appears more probable, a virus, of the nature of which we are as yet ignorant. It is true that I have not hitherto made any attempts to convey the affection from one individual to another by transferring the pus from a diseased alveolus to a healthy one. The fact, however, that it usually begins in the neighborhood of one tooth and never attacks a whole row of teeth at once, and that its extension is best prevented either by treating the diseased alveolus antiseptically as soon as possible, or by extracting the tooth, proves that we have to deal with a *local contagium.*—WITZEL, *British Journal of Dental Science.*

ON TEMPERING OF STEEL.

The word temper, as used by the steel maker, indicates the amount of carbon in steel ; thus, steel of high temper, is steel containing much carbon ; steel of low temper, is steel containing little carbon ; steel of medium temper, is steel containing carbon between these limits, etc., etc. Between the highest and the lowest we have some twenty divisions, each representing a definite content of carbon.

As the temper of steel can only be observed in the ignot, it is not necessary to the needs of the trade to attempt any description of the mode of observation, especially as this is purely a matter of education of the eye, only to be obtained by years of experience.

The act of *tempering* steel, is the act of giving to a piece of steel, after it has been shaped, the hardness for the work it has to do. This is done by first hardening the piece, generally a good deal harder than is necessary, and then toughening it by slow heating and gradual softening until it is just right for work.

A piece of steel *properly tempered* should *always* be *finer* in *grain than the bar from which it is made.* If it is necessary, in order to make the piece as hard as it is required, to heat it so hot that after being hardened it will be as coarse or coarser in grain than the bar, then the steel itself is of too low temper for the desired work. In a case of this kind, the steel maker should at once be notified of the fact, and could immediately correct the trouble by furnishing higher steel.

If a great degree of hardness is not desired, as in the case of taps, and most tools of complicated form, and it is found that at a moderate heat the tools are too hard and are liable to crack, the smith should first use a lower heat in order to save the tools already made, and then notify the steel maker that his steel is too high, so as to prevent a recurrence of the trouble. In all cases where steel is used in large quantities for the same purpose, as in making of axes, springs, forks, etc., there is very little difficulty about temper, because, after one or two trials, the steel maker learns what his customer requires, and can always furnish it to him.

In large, general works, however, such as a rolling mill and nail factory, or large machine works, or large railroad shops, both the maker and worker of the steel labor under great disadvantages from want of a mutual understanding.

The steel maker receives his order and fills the sizes, of tempers best adapted to general work, and the smith usually tries to harden all tools at about the same heat. The steel maker is right, because he is afraid to make the steel too high or too low for fear it will not suit, and so he gives an average adapted to the size of the bar.

The smith is right, because he is generally the most hurried and crowded man about the establishment. He must forge a tap for this man, a cold nail knife for that one, and a lathe cutter for another, and so on ; and each man is in a hurry.

Under these circumstances, he can not be expected to stop and test every piece of steel he uses, and find out exactly at what heat it will harden best and refine properly.

He needs steel that will all harden properly at the same heat, and this he usually gets from the general practice among steel makers, of making each bar of a certain temper, according to its size.

But if it should happen that he were caught with only one bar of say inch and a quarter octagon, and three men should come in a hurry, one for a tap, another for a punch, and another for a chilled roll plug, he would find it very difficult to make one bar of steel answer for all of these purposes, even if it were of the very best quality.

The chances are that he would make one good tool and two bad tools ; and when the steel maker came around to inquire, he would find one friend and two enemies, and the smith puzzled and in doubt.

There is a perfectly easy and simple way to avoid all of this trouble ; and that is, to write after each size the purpose for which it is wanted, as for instance : Track tools, smith tools, lathe tools, taps, dies, cold nail knives, coal nail dies, hot nails, hot or cold punches, shear knives, etc., etc. This gives very little trouble in making the order, and it is the greatest relief to the steel maker. It is his delight to get hold of such an order, for he knows that when it is filled he will hardly ever hear a complaint.

Every steel maker worthy of the name knows exactly what temper to provide for any tool, or if it is a new case, one or two trials are enough to inform him, and as he always should have twenty odd tempers on hand, it is just as easy—and far more satisfactory to both parties—to have it made right as to have it made wrong.

For these reasons we urge all persons to specify the work the steel is to do, then the smith can harden all tools at about the same heat, and he will not be annoyed by complaints, or hints that he does not do his work well.—MILLER, METCALF & PARKER, *Chicago.*

TREATMENT OF PULPLESS TEETH.

In reply to your query respecting pulpless teeth, allow me to say that I never kill babies for the sake of having a funeral, and therefore have little to say respecting the treatment of teeth whose pulps have been purposely destroyed. When a patient applies for the treatment of a pulpless tooth, I first ascertain the existence or non-existence of pericemental inflammation, acute or chronic.

Where there is no tenderness upon occlusion, I proceed to clean out and thoroughly disinfect and fill at the same sitting. I do not think it so vitally important, as some do, to select a special disinfectant. The one I have used longest and with most satisfaction is oil of cloves and wood creosote, equal parts, thoroughly pumped into the canal, after drying out of which with a dressing needle wrapped in bibulous paper, I am careful to fill clear to the apex with gutta-percha in chloroform.

In case there is an open fistula, the pumping of the creosote and oil of cloves will appear at the orifice as evidence of saturation of the locality with the remedy.

In this case it is not so important to be careful in drying with bibulous paper, as the liquid gutta-percha, when properly inserted, will force the disinfectant through the canal of the root and fistula to its orifice.

I am careful, under these circumstances, to use a sufficient quantity of the gutta-percha to exude from the orifice to form a bulb on the exterior, which I allow to remain until the next day, when taking hold of the button with gentle traction, the gutta-percha will separate at its weakest point (usually at the apex of the root), and then the fistula will heal and leave the end of the root in an aseptic condition.

The only difference in the treatment where no open fistula exists, involves the uncertainty in packing the gutta-percha thoroughly without bubble entirely to the end of the root. The attempt to accomplish this is made by taking the measure of the length of the root by passing a small dressing needle, hook-pointed, through the foramen, and drawing back until it catches on the point of the root, marking the needle at the exact length, to allow the reduction of, say $\frac{1}{32}$ to $\frac{1}{16}$ in., on this measure transferred to a wheel-bur of proper size, which is to be passed into the canal, leaving a shoulder against which the gutta-percha is packed with a needle large enough to stop from passing through the foramen, and wound with a little cotton, and allowing the liquid gutta-percha only to fill the canal beyond the shoulder to the end of the root. I always expect first-class results, but if, from any untoward circumstances, an abscess should form, it is a very easy thing to abort it where you have control of the case, and without removing your filling. It is an aphorism with me that when a root of a tooth is properly filled it is never necessary to remove that filling as a part of the cure of abscess. Even in cases where by neglect an abscess has proceeded so far as to incite necrosis of the cementum or portions of the socket, all that is required is to freely open into the locality, bur out all the dead tissue, and leave to nature.

What I mean by aborting is to thoroughly incise the gum periosteum, alveolar plate, peridontium and cementum to the end of the root, being careful to cut far enough from the end and down on to the root to completely open up the seat of the incipient abscess without withdrawing the knife. Make three plunges, one directly over the end of the root and in line with greatest strength, and one on each side of the apical space to thoroughly open the affected territory. If the instrument has been perfectly clean it is not important to insert a tent in the opening, as these cuts uniformly heal by first intention. But to be doubly certain in case of any doubt, you may insert a tent of cotton or bibulous paper tightly wound on a dressing needle, to the depth of the cavity (after dipping it in the oil of cloves and creosote), to secure a fistula for future use. Have some vinegar at hand to dissolve away the excess of creosote and oil of cloves about the orifice of the incision, to prevent it from forming a sore in the gum or on the lip. It may be well to say that when a case presents with great tenderness or high inflammation of the pericemental membrane, with or without fistula, I proceed by tying a strong ligature (usually silk) around the neck of the tooth, forming a loop at its free end, through which to pass the handle of an instrument for the patient or assistant to pull upon for the purpose of overcoming the tenderness and pain consequent upon the pressure of the drill used in opening into and through the canal *and apex* into the abscess.

If a fistula be open, it is only necessary to pump the kreo-clove through, leaving the cotton piston in place and dismissing the patient, after neutralizing with vinegar, when at the next sitting the soreness will have disappeared and you can proceed to fill.

When there is no fistula, and the tenderness is very great, ligate the tooth with silk and put traction on the tooth as before, and open through the gum and other tissues to the point of the root, and continue to completion of the operation as before.—ATKINSON, *Archives of Dentistry.*

GUTTA PERCHA FOR FILLING TEETH.

I heartily indorse all that was said about using steam heat in preparing the filling for the cavity, and the heating of instruments also. Too much care cannot be taken in this matter. Heating any gutta-percha stopping over the flame of a lamp is bad practice, and generally results in more or less injury to the filling. Dr. Hill once told me he was convinced comparatively few dentists used gutta-percha in such a way as to obtain the best result. My experience induces me to indorse what he said so many years ago.

Regarding the longevity of gutta-percha fillings, I want to say that undoubtedly it is true that in a few instances fillings made of gutta-percha remained in teeth twenty years or more. Prof. Flagg left it a fair inference that the same result would obtain now if the case was favorable and a good quality of gutta-percha was properly used. The inference is *misleading* and *untrue.*

In a paper on gutta-percha read before this society four years ago, I stated that the gum obtained by cutting the tree and scraping the inside of the bark was much superior to any obtained by tapping. It is to that superior quality of gum—which Dr. Hill used the first years of his experience—that the results so much talked about are due.

The specimens displayed by the speaker, both the crude and that which was prepared for the teeth, are the product of tapping. Fillings made in the best manner with such material will not last longer than from two to eight years. Very few indeed will last more than four. Let us not deceive ourselves. It cannot be depended upon as formerly. The reason is the inferiority of the base. A fountain does not rise above its source.

I object to the speaker's position in claiming so much for the material. It is very useful, and the cause is weakened by claiming too much. Young practitioners should be taught these facts instead of accepting the fair inference from Prof. Flagg's remarks that if his steam-made stopping is used all will go well for from five to thirty years. His statement that red gutta-percha shrinks more than any other may be proved by test-tubes, but my experience proves that it will last longer than the average stopping. One reason is it has less foreign substance incorporated into it. Pure gum would outlast any other, and if it could be used to advantage it would be almost perfect as to its lasting qualities. Its color, however, is objectionable.—Payne, *Dental Cosmos.*

METHOD OF ADAPTING AND SETTING ARTIFICIAL CROWNS.

All those who set artificial crowns to roots of teeth, understand the advantages of having each piece separate, viz.: The facing, band, and pin. It is also desirable to have these in one solid piece before cementing to the root, leaving no place for secretions and having a strong, substantial crown. 1st, adapt the band or ferrule to the root; 2nd, take a plate tooth with pins crosswise, grind the cervical portion to fit over the band, neat with the gums; 3rd, place the pin in position, close the pins in the plate tooth to hold the pivot pin, back up with wax to hold the band tooth, and remove all from the root. Mix some finely powdered white glass with water and work in between the band and tooth crown, invest in marble dust and plaster, and remove the wax. With the blow pipe gradually bring all up to a red heat. Select a piece of white or opaque glass about the size of the wax removed. Fuse with the blow pipe, and while in a molten state, press in by touch of an instrument, especially soap-stone, or clay pipe stem ground to suit, to fill the space left by the wax; when cool grind with a corundum stone to the desired shape, and polish with pumice stone on a felt wheel.

Always cover the piece with asbestos foil while cooling. This is the practical crown and equal to any crown with the pin baked in.

Another way to make a fine crown : Take the old wooden pivot tooth, cut a slot into the pivot hole lenthwise from posterior side of the tooth, band it, and proceed as above.

Glass when fused has a great affinity for artificial tooth substance and for gold, and will fuse at a point less than 20 karat gold. As to strength it is all that is required for the purpose.

After filling properly make holes with a diamond drill, place some of the powder around the pins, fold in a piece of asbestos paper and fuse with the blow pipe. Pins broken from artificial teeth can be replaced by this process equal to those baked in.—DAVIS, *Ohio Journal.*

TIN AND GOLD FILLINGS.

In the April number of the *Dental Register*, pages 191-2 may be found the following statements :

Dr. Conrad—Said that a short time since Dr. Eames had a patient of Dr. Herbst's. There were about fifty of these combination fillings in the mouth. In ten or twelve the tin had disappeared entirely, in two or three partially, and the other fillings were in such a condition that they all had to come out. The failure was attributed to the kind of tin used in the operations.

Dr. Watt—Said that in some cases the action brought about by the combination caused uneasy sensations or pain in the tooth and sometimes so severe as to cause sleeplessness. He stated that it was not thoroughly understood just what the trouble was, but he was of the opinion that it was thermal electricity.

Dr. McKellops—Had seen much of the combination filling, but there was nothing that gave him more satisfaction than gold. He thought non-cohesive gold was just as adaptable as tin or tin and gold. This could be proven by experiment. Take tin and adapt it to the wall of a cavity, and then adapt pure gold to the same wall, and you will perceive that the hair lines on both are precisely alike.

To these statements permit me to answer first : No kind of tin foil I ever saw, not even that which comes around soft cheese, is bad enough to account for the failures mentioned by Dr. Conrad. *Rotation did it.* The first layers of tin-and-gold may be pressed against the walls of the cavity by a rotating burnisher or by a hand burnisher, but any one who attempts to complete a tin-and-gold filling by rotation alone, must I fear, expect the results recorded by Dr. Conrad.

I do not at all agree with, in fact I most emphatically disagree with Dr. Watt's statement. Having used tin-and-gold in over ten thousand cases, and seen nearly as many more where it had been used by Drs. Abbott, Jenkins, Sachs, and others, I have in not a single case observed any uneasy sensations characteristic of this combination.

Dr. McKellop's experiment is not a test of adaptability, although curiously enough it has been looked upon as such by dentists for many years.

According to this test extra-cohesive gold foil is more adaptable than either non-cohesive gold foil or than tin foil, while rubber or coffer-dam, which we know is an excellent material for obtaining a water-tight joint, is absolutely non-adaptable. We can obtain a beautiful impression of a coin with extra-cohesive gold foil, a less perfect impression with non-cohesive or tin foil, and no impression at all with rubber. This experiment indicates simply the property of retaining an impression once given. Adaptability must be tested in altogether a different manner. Having used both non-cohesive gold and tin-and-gold very extensively, I do not hesitate to attribute a higher degree of adaptability to the latter material.—Miller, *Dental Register.*

PULVERIZED PUMICE AND GLYCERINE.

Pulverized pumice and glycerine, mixed and kneaded into a stiff dough, will be found useful for taking impressions of tooth-cusps or other surfaces which it is desirable to reproduce in metal to serve as dies. Molten metal of any kind can be at once poured into such molds. The dough may be agreeably perfumed with a few drops of lycopodium.—Osborn, *Dental Cosmos.*

ON ANNEALING STEEL.

Owing to the fact that the operations of rolling or hammering steel make it very hard, it is frequently necessary that the steel should be annealed before it can be conveniently cut into the required shapes for tools.

Annealing or softening is accomplished by heating steel to a red heat and then cooling it very slowly, to prevent it from getting hard again.

The higher the degree of heat, the more will steel be softed, until the limit of softness is reached when the steel is melted.

It does not follow that the higher a piece of steel is heated the softer it will be when it is cooled, no matter how slowly it may be cooled ; this is proved by the fact that an ingot is always harder than a rolled or hammered bar made from it.

Therefore, there is nothing gained by heating a piece of steel hotter than a good bright cherry red ; on the contrary, a higher heat has several disadvantages : First, if carried too far, it may leave the steel actually harder than a good red heat would leave it. Second, if a scale is raised on the steel, this scale will be harsh, granular oxide of iron, and will spoil the tools used to cut it. If often occurs that steel is scaled in this way, and then, because it does not cut well, it is customary to heat it again, and hotter still, to overcome the trouble, while the fact is, that the more this operation is repeated, the harder the steel will work, because of the hard scale and harsh grain underneath. Third, a high scaling heat, continued for a little time, changes the structure of the steel, destroys its crystalline property, makes it brittle, liable to crack in hardening, and impossible to refine.

Again, it is common practice to put steel into a hot furnace at the close of a day's work and leave it there all night. This method always gets the steel too hot, always raises a scale on it, and worse than either, it leaves it soaking in the fire too long, and this is more injurious to steel than any other operation to which it can be subjected.

A good illustration of the destruction of crystalline structure by long continued heating may be had by operating on chilled cast iron.

If a chill be heated red hot and removed from the fire as soon as it is hot, it will, when cold, retain its peculiar cystalline structure ; if now it be heated red hot, and left at a moderate red for several hours; in short, if it be treated as steel often is, and be left in afurnace over night, it will be found, when cold, to have a perfect amorphous structure, every trace of chill crystals will be gone, and the whole piece be non-crystalline gray cast iron. If this is the effect upon coarse cast iron, what better is expected from fine cast steel ?

A piece of fine tap steel after having been in a furnace over night will act as follows :

It will be hard in the lathe and spoil the cutting tools.

When hardened it will almost certainly crack ; if it does not crack it will have been a remarkably good steel to begin with. When the temper is drawn to the proper color and the tap is put into use, the teeth will either crumble off or crush down like so much lead.

Upon breaking the tap, the grain will be coarse and the steel brittle.

To anneal any piece of steel, heat it red hot ; heat it uniformly and heat it through, taking care not to let the ends and corners get too hot.

As soon as it is hot, take it out of the fire, the sooner the better, and cool it as slowly as possible. A good rule for heating, is to heat it at so low a red that when the piece is cold it will show the blue gloss of the oxide that was put there by the hammer or the rolls.

Steel annealed in this way will cut very soft ; it will harden very hard, without cracking, and when tempered it will be very strong, nicely refined and will hold a keen, strong edge.—MILLER, METCALF & PARKER, *Chicago.*

DO TOOLS GROW TIRED.

A correspondent of the Iron Industry Gazette says : Tools, like men, grow "tired." I have seen a first-class chisel get "tired," and act as though it was possessed of the King of Sheol. It would not keep its edge, and the more I sharpened it the sooner it would lose its edge.

I called the attention of a shopmate, a grizzled old veteran, to the peculiar behavior of the chisel. He looked it over and handed it back to me, saying : "The tool is all right, only a little tired. Lay it away and let it rest. It will come out all right again, just like a man who is tired" I did not believe the old fellow, and I really thought he was crazy to talk of a tool getting "tired," but as there was no help for it the tool was laid away. I do not remember how long it was left to "rest," but when it was again sharpened and used it appeared to hold its keenest edge as well as it did before it got "tired." Barbers tell me their razors in constant use get "tired," in the same way, and woodchoppers say their axes sometimes seem to get "soft" all at once. Possibly constant and hard usage may cause changes in crystallization that would account satisfactorily for the peculiarity alluded to. Locomotive engineers often observe peculiar misbehavior in their machines, which may possibly be the result of continued heating, and pounding. When a tool gets "tried," or a machine "balky," give each a rest.

Mechanics who are not well informed, in these days of cheap valuable books, have only themselves to blame. Generally the tool handler who "gets on" in the world is the one who has read what has been printed concerning his work. When a foreman is incapacitated by sickness or accident, it is the intelligent subordinate who is called to fill his place either temporarily or permanently.—*Mechanical News.*

TRANSPLANTATION OF BONE.

He regards the following points of importance: That a perfectly healthy bed of granulations must first be secured,—preferably by means of iodoform gauze packings. The grafts should be taken from the bone of some young and rapidly-growing animal, and from as near an epiphysis as possible, that the utmost vital action may be secured. They should consist of both bone and periosteum, and perhaps even cartilage of ossification may be of advantage. Their maximum size should not exceed one-third of an inch in length and one-quarter inch in breadth. Grafting has been successfully done with human, kid, and dog bones. These are probably the best sources. The grafts should be so planted that they will have free vascular connections on all sides, for such was their condition before transplantation. This may be accomplished by incisions into granulation beds. The grafts must be held down by *moderate* pressure, so that they shall not be forced from their location by newly-forming granulations.

Strict, but not too powerful, antisepsis should prevail, so that the discharges may be kept at a minimum and sweet.

The dressings should not be changed more often than is necessary to secure this desideratum; hence should be large and very absorptive.—*Pacific Medical and Surgical Journal.*

SENDING LIVE LOBSTERS TO CALIFORNIA.

The United States Fish Commission shipped from Wood's Holl, June 16, 600 live lobsters and 250,000 lobster-eggs. Of the former, 350 arrived safely in Sacramento, Cal., June 22, and they have been deposited in the Pacific north and south of San Francisco. Several previous attempts to take live lobsters across the continent have failed. Of those sent only as far as Chicago, packed in seaweed in crates, only one in four survives.

Colonel McDonald, fish commissioner, personally superintended the packing of the lobsters lately sent to California. A crate or box devised by the late Captain Chester was used. This was placed within another larger box, the intervening space being filled with pounded ice. In the inner box the lobsters were placed between layers of rockweed, which at times was moistened with sea water. Each box had an independent drain, so that the fresh water from the melting ice could not enter the lobster box. The temperature of the latter was kept at 45° F. A fish-commission car was used, the boxes along the side of it serving as the outer box of the combination described above; one hundred crates, each containing six lobsters, being placed in them, and surrounded with ice. Each morning before sunrise a careful inspection of the lobsters was made, and those that had died were removed. The first day 45 died; the second day, 55. After that the mortality was much less. All of those that died were in an advanced state of shedding, and were in poor condition when they started.

One-half of the 350 lobsters that arrived safely on the Pacific coast were placed in the ocean north of San Francisco, and the other half south. It is hoped that this experiment may demonstrate the feasibility of stocking the waters of the Pacific on the California coast north of Monterey with this delicious shell-fish. The condition of the water in that region is quite similar to that of the Atlantic off the Massachusetts coast. The temperature is about the same, except that it is more constant. The lobster on the Massachusetts coast crawls out into deep water in the summer, where the temperature is low, but it is thought that the equable temperature of the Pacific will enable the lobster in those waters to spend the whole year in one spot.

Hatching-apparatus was taken to California with the 250,000 lobster eggs shipped. The young lobsters produced by these eggs will be deposited in the sea at once. Although a fair trial will be made to determine the possibility of stocking the Pacific by artificial propagation, much more confidence of success is expressed by Colonel McDonald from the introduction of mature lobsters. The young lobsters have to be placed in the sea almost as soon as they are hatched, and begin to feed most voraciously, even devouring each other. For a few days they swim on the surface of the water, where they find food suited to their requirements, but where they also encounter millions of enemies. After their walking or crawling organs are developed, they sink to the bottom, which they then make their home. One of the problems which the United States Fish Commission is now attempting to solve, is the invention of some method of keeping the little lobsters in confinement and safety after they are hatched, until they have attained sufficient strength and size to enable them to protect themselves. The importance of such an invention will be appreciated when it is known that, from the 12,000 to 15,000 eggs produced by a female lobster in a year, not more than two lobsters, when left to nature, become full grown. Not only are almost all the little lobsters destroyed by their enemies, but a large proportion of the eggs are devoured by fish and sea-birds before they are hatched. If, after artificially hatching the eggs, the Fish Commission could protect the young lobsters until they are large enough to take care of themselves, the supply of lobsters, which is now hardly equal to the demand, and would not one-half supply it if the price was reduced, might be increased almost indefinitely.—*Science.*

PHOSPHOROUS NECROSIS OF THE JAWS.

That the disease is a local expression of the constitutional condition produced by the inhalation of the vapor of phosphorous, and by particles of the agent taken into the system with the food, by operatives in match factories who do not give proper attention to cleanliness of the hands.

That the introduction of the agent into the system is, as a rule, very gradual, and in such small quantities as to avoid the production of symptoms of acute poisoning ; that, in this way, the chronic toxic condition of the system is induced, characterized chiefly by disintegration of the red blood corpuscles and fatty degeneration of the arterial coats.

That the toxic condition precedes the jaw disease, as is shown by the fact that the disease does not attack operatives recently exposed to the action of the agent, but those who have been exposed for a period of years.

That examination of the teeth of operatives has shown that many who have caries, and have returned to work immediately after extraction of teeth, have enjoyed immunity from the disease, showing that the agent had not attacked the periosteal tissue thus exposed. This was further shown by the fact that, in one of the cases, necrosis did not appear until three months after labor in the factory had ceased.

That individuals vary in their susceptibility to the action of the poison; for this reason many suffer immediately with acute symptoms, such as nausea, vomiting, etc., and are compelled to abandon work in the factories.

That the conditions under which experiments have been made on animals, to prove the absence of the disease until exposure of the periosteum and peri-alveolar tissue was affected, are not similar to those to which operatives in match factories are affected.

The treatment of the disease in the primary stage is efficient and prevents its progress.

That the antidotal powers of turpentine have been established.

That the disease is to be prevented among operatives by the adoption of thorough methods of ventilation, stringent rules with regard to cleanliness, and the free disengagement of the vapor of turpentine in all the apartments of factories in which the fumes of phosphorous escape.—MEARS, *Trans. American Medical Association.*

DON'T.

The great activity prevailing in this country at the present time in the principal electrical industries, is very naturally attracting the attention of many young men abroad, especially in England, who, after graduating from some technological institution, and providing themselves with unexceptionable letters of introduction to some one in New York, speedily find their way across the Atlantic, in full confidence that remunerative employment awaits them immediately upon arrival.

Our transatlantic contemporaries cannot do many of these young gentlemen a greater service, than to persuade them, if possible, to accept and act upon the celebrated advice of *Punch* to those about to marry. While it is true that most of these persons ultimately find employment in some capacity or other, yet not a few have been compelled to undergo experiences which are, to say the least, exceedingly humiliating to a sensitive soul. Many of them are supplied with barely more than enough money to land them in New York; they then learn, to their dismay, that almost all the electrical establishments of importance are situated at distances varying from 200 to 1,000 miles or more from the metropolis, and can only be reached by an expensive railway journey. They further find, usually to their very great astonishment, that their letters of introduction and of recommendation, so indispensable in Europe, are of little more account on this side of the ocean than so much waste paper. A man in this country always expects to apply for a situation on his own merits. "Influence" goes for little or nothing. If an employer happen to have a vacancy and the applicant appear to be capable of filling it, he is likely to have a chance to try, even though he may be an utter stranger. If he were backed by a personal letter from the President of the United States, it would as a rule make very little difference. One thing is absolutely essential—the candidate must know how to do work with his own hands, and skillfully at that, or he will find there is no room for him in an American establishment.

We do not say this to discourage our English cousins, for we are well aware that many of the most successful electrical engineers in America have come here as young men, from across the seas. But it will save much disappointment if those who may come hereafter start with a definite conception of the industrial conditions and customs of this country, which differ so widely in many respects from those to which they have been accustomed at home.—*Electrical Engineer.*

SURGERY AMONG THE ZULUS.

Surgery is the branch of medical art that, among the Zulus, can be said to be the most advanced. Their treatment of wounds is especially remarkable, and in several complicated cases treated by myself according to the usual methods for two or three months without success, their native physicians brought about a cure in a comparatively short time. Their system is based principally upon the *earliest possible obturation of all wounds.* They first extract the foreign body, bullet or spicule of bone that may be present, in the rudest possible manner, using their fingers or rough forceps. They then close the wound carefully and cover it with a thick paste composed of charcoal and mutton suet, taking care that no portion of the lacerated tissues remain exposed to the air. They treat fractures as we do, using pieces of bark, suitably cut, for splints. I have never seen traces of amputation among them. Swellings of all kinds, the early stages of abscess or anthrax, inflammatory rheumatism, etc., are treated by means of the bulbs of the genus Allium, onion, wild garlic, etc. The bulb, being steeped in water heated almost to the boiling point, is applied while still hot. This treatment is attended with marvellous results, large and very painful swellings disappearing completely in the course of a few hours. The secret of their physicians is the proper selection of the bulbs to be used in a given case. Another valuable remedy much employed by them in swellings and general cutaneous eruptions, elephantiasis, etc., is the wild castor bean, half the size of that employed by us. The Umzilla Zulus collect it from the gizzards of birds in the half digested and fermented state in which it is found there. They fill a wide mouthed jar with it, and allow the process of fermentation to continue by exposing it to the sun and air during a period of two months. They then crush the mass and mix it with water, stirring at the same time. The oil found floating upon the surface literally melts away the swelling of sprains, rheumatism, etc., so great is its beneficial power. It must not be forgotten, however, that other ingredients, unknown to me, may play an important part in the results obtained.—*The Satellite.*

"OPPROBRIUM" UNDER COVER OF BOOK NOTICE.

HUXLEY'S "Practical Biology."—The work is undoubtedly accurate: the authors' names are not needed as a guaranty of this. The omission of figures and plates is objectionable to some; but the true use of the work, that of a guide to the student in the examination of specimens for himself, neither requires nor desires such. It is too advanced for the general undergraduate student, but is excellent for post-graduate work in preparation for medical studies. Some day, though we fear it may be far in the future, such preliminary work as this will be required of all medical students; it would go far towards mitigating the very just opprobrium under which most medical colleges of our country now suffer,—that of being the most unscientific of all scientific schools. The work would be improved by a more comparative morphological treatment. But little is said of the general principles underlying the structure, and the relations of the general types are not made apparent, as they should be.—*Science.*

DISTILLATION OF MERCURY AT ORDINARY TEMPERATURES.

In the physical laboratory of the United States Geological Survey a normal barometer hangs in a window-jamb about 35 centimetres from the glass of the window. As the window faces east, it has the sun until noon. The barometer-tube at and above the upper surface is 25 millimetres in diameter, and extends 6 centimetres above the mean position of that meniscus. It was observed that during the summer small globules of mercury covered the inner wall of the tube above the column, on the side farthest from the window. In the winter they collected upon the side nearest to the window. An inspection showed that the radiation from the tube was greatest toward the cool room in the summer, and toward the window and out of doors in the winter, thus keeping the side of greatest radiation slightly cooler than the mass of the reservoir,. and condensing upon it some of the vapors of mercury of the Toricelli vacuum. In this way several grams were condensed and fell back in a single month, —a fact which seemed quite interesting when it is remembered that the vapor-tension of mercury at even 30° C. (86° F.) is only .06 of a millimetre. Of course, by bending the top of the tube over and downward toward the cooler side, the distillate could be collected and measured.—HALLOCK, *Science.*

MAKING AND TEMPERING INSTRUMENTS.

This paper is not intended for experts, but for those who are still in the dark on this subject. The making and tempering of dental instruments seems to be considered by many an exceedingly difficult and mysterious process ; but the facts are that it is very simple, and easy of accomplishment by the average dentist.

One of Fletcher's gas or gasoline forges, No. 19, will be found useful for this purpose, especially in small forging and repairing. Instructions for its use may be found in Fletcher's catalogue of "Laboratory Apparatus." It costs, with foot-blower, blow-pipe, and rubber tubing complete, about eighteen dollars. This, with a medium sized anvil and several hammers of different sizes, make a respectable outfit. If a man has a decided taste for this kind of work he may procure other appliances that will be of value, but for the ordinary dentist who wishes to make a new instrument only occasionally, this is an unnecessary expense, as he can accomplish his purpose with one of Fletcher's solid flame burners, No. 46, costing two dollars. Use with this a good mouth blow-pipe, and it will prove very efficient. In forging, the first thing is to have in your mind a perfect conception of the instrument you wish to make. Exercise care in heating, as steel is injured by too much heat. Do not use the hammer before the requisite temperature is obtained, and distribute the force as evenly as possible ; that is, turn the steel at every blow, striking first on one side, then on the other. Always keep vividly in the mind's eye the form of instrument you wish to make, and conform every blow to this idea.

Of course, in making small instruments, as thin scalers, excavators, etc., the forged instrument will be two or three sizes larger than needed when finished. Be sure and leave it large enough for grinding, but endeavor to be as exact as possible in regard to the form. Hammer it into shape rather than use the file, as the instrument will be tougher, more springy, and have a better cutting quality.

When the instrument is formed, use fine sand paper or emery cloth to remove the effects of the heat. This must be repeated at every subsequent heating. It is now ready for tempering. Use the solid flame burner with the blow-pipe. Gently rotate the instrument in the flame till it reaches a bright cherry red, then quickly plunge it into cold water. If you are in doubt as to the temper, test it with a file. If it is too soft, clean it as before and repeat the process, carefully observing the heat for a higher temperature. The beginner may have to repeat several times.

With the instrument highly tempered, go over it again, using sand paper, etc., to remove the effects of the heat, being careful not to break it, as it is, in its present state, capable of little resistance.

The next step is to draw the temper, so that we may have a spring at the neck and shank, leaving sufficient hardness at the cutting edge. To do this, force the blade into a piece of soft pine about an inch square, and throw a flame from the blow-pipe upon the larger part of the shank till it assumes a blue color. As the color passes up the neck, if the point in the wood be small, stop it just before it reaches the wood ; but if large, let the color run to the wood, and then check it instantly. This will give a strong shank, spring temper at the neck, and keen cutting edge that will not crumble or turn in cutting tooth substance.

In tempering long bladed instruments, as thin scalers, excavators, etc., do not force more than one-third or one-half of the blade into the wood, and as the color passes over the neck and down the blade arrest it in a bright straw color just before it reaches the wood. This gives a spring temper throughout.

Now comes the important point of grinding the instrument. Keep the stone wet and place the instrument on the stone in precisely the position that you wish it to remain throughout the grinding. On removing for any cause, be particular to return it in the identical position it occupied before. In this way you can grind a delicate instrument accurately; and delicacy is of the utmost importance. Not one dental instrument in ten is made small enough. They are clumsy, and they are not tempered properly. They are too rigid. We want instruments that will cut tooth substance, and not batter it down by force. As an example in fine instruments, compare Dr. Cushing's scalers with those usually found on the market, and when you have used the Cushing scalers once, you will wonder how you ever succeeded with others.—MARRINER, *Independent Practitioner.*

POLYPUS OR SIMPLE HYPERTROPHY OF THE GUM.

This is purely a local affection of the gums alone, quite apart from the periosteum. It is generally associated with uncleanly habits, the presence of tartar or some other form of irritation, and is usually most marked along the borders or margin of the gums, and especially the interdental portions. It consists in a simple hypertrophy of the gum tissues, and is brought about by some long-continued irritation. The gums may be so increased in size as to nearly cover the crowns of the teeth, and it is most commonly met with, and most pronounced, in the front part of the mouth. These two models I now send round are very good examples of this affection. They were lately presented to our society by Mr. Jones. The treatment as a rule is very simple, and consists in scarifying the gums and getting rid of the irritating cause, *i. e.*, by thoroughly cleansing the teeth, removing all tartar, and washing the mouth occasionally during the day with a strong solution of tannin or other harmless astringent, to which may be added a very small quantity of Condy's fluid. The gums will then, usually, soon recede to their normal size and condition. I saw a case, yesterday, which Mr. Humby treated for a long time before curing his patient. This was caused in first instance by wearing a regulation plate. The hypertrophy was so extensive and rapid that the wearing of the plate had to be discontinued.

A more truly polypoid form of this same affection of the gum may be very frequently seen in connection with almost any large cervical cavity. It occurs as a small pedunculated mass, resembling the gum tissue, and more or less fills up the cavity. It is due to the constant irritation caused by the rough edge of the cavity coming in contact with the gums. The irritation leads to a slight chronic inflammation and consequent overgrowth of the existing gum tissues (*i. e.*, hypertrophy), in which the true mucuous membrane elements take part. The tumor is usually tender and at times painful. The treatment, if any be required, consists in removing the cause, either by filling the cavity or getting rid of the tooth or root with its projecting sharp edge. When nothing more than simple excision of the growth is performed, it almost always returns. This is well illustrated in a case which Salter relates, in which the hypertrophied mass was about half as large as a chestnut, and much resembled ordinary gum in appearance. At first sight it might very easily have been mistaken for an epulis. It arose from the portion of gum situated between the three separated roots of an upper first molar, and was attached by a short pedicle. It was first excised, the stumps were then removed, and there was, of course, no recurrence.—*Dental Record.*

DENTAL SOCIETY OF THE STATE OF NEW YORK.

Reported Bjones DeSmith, D. D. S.

[Continued from page 149.]

He thought an occasional paper upon the subject of professional jealousy would do more to tame them and make them humane and charitable than anything else.

Dr. Green had learned something, and he heartily agreed with Dr. Rhein. Hereafter if any present came to see him, they would find his little bills made out for "professional" services.

The President said: If they were professionals, then they were entitled to pay for professional services, and it was only in a suit at law that they would be required to give a detailed statement. He had never seen a dentist who was not able to make up a bill and itemize it when it had come to the point, whether he had made a record of it or not.

Dr. Baxter read a note which he had just received from the Executive Chamber to the effect that the Governor had taken up the Society's bill and just signed the same.

The President proposed three cheers for Dr. Carr, which were given with a will.

Dr. Jarvie thought this bill made the dental laws of the State the most complete of any in the Union.

The President thought that on this twentieth anniversary they might be proud and feel a little puffed up. The stenographers had taken the dental law as a basis from which to draft a similar law for their profession, and, so far as he knew, other bodies had likewise complimented the New York society as a law-making body.

Dr. Rich continued the discussion in regard to professional services. His patients sometimes said to him that a filling had come out, and inquired what he was going to do about it. He asked if they had ever been sick and had a doctor, to all of which they had replied in the affirmative. He then asked them if this had ever occurred a second time, and hadn't they paid him both times. Receiving a further reply in the affirmative, he simply said he guessed they would pay him both times, too.

Dr. Littig said it had been his custom to send out a diagram of fillings, everything in detail. He had done so until a patient to whom he had sent them for some time came in, and took occasion to rate him upon the diagram. His patient had simply said "trade mark."

The President related the case of a very respectable and conscientious practitioner who kept a brass plate with small holes in it, by which he graduated his prices. For a given size he charged two dollars, for a smaller one dollar, for a larger five or more. Could there be anything more degrading? And the man was a skillful practitioner.

Dr. Jewell asked as to the best time of sending bills, whether at the end of six months or a year, or at the end of the month.

The President said, "Frequently."

Dr. Curtis used to send in his bills every three months. He had learned to send them in when the work had been completed. He collected all his bills promptly, but had got the name of being always "hard up."

At this point Dr. Carr came into the room, and was greeted with cheers, on account of his success as chairman of the Committee on Dental Law.

Dr. Carr said he had been informed that it would be impossible to have the bill signed in less than two weeks, and he had determined to find some one close to the Governor. He had found Dr. Baxter and started him at work, and then Dr. Walker, who understood how to do such things, and by whom he had been introduced to some of the senators. They had succeeded in getting the bill signed, and it was then a law. He thanked all for the assistance they had given the committee, and promised to see to its enforcement during the year.

Dr. Southwick said they had asked the Legislature from time to time for a good many years for amendments, until they had finally gotten all that could be desired. As a matter of self protection, they should not interfere, nor ask for another thing for a good while. If they did, the Legislature would sit down on them, and wipe all dental laws out of existence. Three years before they had came pretty near wiping out all the dental laws on the statute books, and simply because the profession in this State had been bothering them. They were on the statute books to sue and be sued, and should let the law-makers take a rest.

Dr. Carr said that there had been many objections made to the bill, even after it had got to the Executive Chamber, but he had cleared them up pretty well. During the winter he had received communications in respect to the bill calling for a clause that it should make it unlawful for any person to administer chloroform, ether or nitrious oxide gas for the extraction of teeth, unless a graduate of a dental college or had received a certificate from this society, or was a member of a regular society. They had got all the law they needed.

On Dr. Jarvie's motion, essayists were privileged to publish their papers in journals of their own election.

On motion of Dr. Mirick, the Secretary was paid one hundred dollars, notwithstanding his exaltation.

Drs. Atkinson, Curtis, Rhein and Brockway took another "hack" at the report on practice.

Dr. Southwick gave the society a practical talk on rubber plates, their adaptation, etc., using plates and models by way of illustration.

After an animated discussion, the society adjourned to the Delavan House to banquet.

CAP OR KILL—WHICH?

BY B. L. HERT, D. D. S.

[Abstract of Paper read before Rochester Dental Society.]

When a student at school I became convinced that an exposed pulp in a tooth should rarely be destroyed, and that arsenic need be rarely if ever used. Capping was the correct and the only correct thing to do, and on that line I started out with all teeth of that character. Following this for some time I found that everything did not turn out just as I had hoped and expected, and as there was arsenic in the office I was in, I began in some cases to use it, and would later on remove the pulp, then fill the root or roots, and it was not very often that I had any trouble from the teeth filled in that way; while with those with capped pulps the contrary was the case. Of course a comparison could hardly be avoided even if desired, and gradually the uncertainty of capping forced itself on me, and by degrees I used arsenic more and more, so that now it is about the only thing I think of doing when having an exposed pulp to deal with.

Another reason which led me to change my method of treating this class of teeth was that it usually required too much time considering how uncertain the operation. A dentist will take an hour's time, and sometimes more, and then after a while, the length of time varying in different cases, often find that all this time has been wasted, and that the tooth will have either to be extracted or refilled after destroying the pulp, and at such time, the person having the work done, if charged for both operations, will often say that they do not see why they should pay for other peoples mistakes; or make some other pleasant remark very much like it.

Another reason was that in an anterior tooth after capping, if unsuccessful, the pulp would frequently suppurate or die before the filling could be removed, and the tooth would usually become quite discolored, the filling would have to be taken out, the tooth treated, and after it had been again filled the operation would not be nearly as satisfactory as it would have been had I destroyed the pulp in the beginning, for it would then have consisted of but two or three sittings, and the discoloration if any would not have been nearly as great. Of course in posterior teeth the discoloration would not have been as serious an objection.

These constituted the main reasons for my giving up pulp capping, although of course lack of success such as some dentists claimed to have had, and I had hoped to have, was at the bottom of all other reasons.

In the course of the discussion which followed—

Dr. Miller said in substance, that whereas he had capped, now he killed, unless there were special reasons tiding a tooth over or through a critical period of tooth history. He had always had a dislike for arsenic in its usual form, using as a substitute arsenic as associated with cobalt. He had also used capsicum with which to worry the pulp by easy stages to death. The after effects had pleased him over and above what he had been able to obtain by means of arsenic. Still, he had used the latter oftener than capsicum, because of the saving in time.

Dr. Howard used arsenic, and distroyed the pulp when he could not otherwise obtain satisfactory results. He had capped, and with such success that he was invariably tempted to try it again. He had tabulated his work, and his records showed many successes and but few failures.

Dr. Arnold had destroyed the pulp only occasionally, capping when there was a fair promise of success. Of late he had caused a good deal of pain in his attemps to destroy the pulp with Prof. Truman's preparation of arsenic, iodoform and carbolic acid, to which several others made wholesome confession.

Dr. Hofheinz called attention to Prof. Truman's injunction to make the preparation fresh for each case. The speaker capped in some cases, killed in more, using arsenic, or in bridge work or crowning the orange wood splint.

Dr. Cowan capped or killed, according to the promise of success. He took few chances, greatly preferring the method that would insure the greatest degree of comfort for long time.

Dr. Line had capped pulps nearly exposed, fully exposed and half gone, where the line of demarcation was well defined, using in the last-named cases Sheffer's saccharated pepsin, so liberally advertised for the purpose in the then famous *Missouri Dental Journal.* Except in rare cases, he confined capping to teeth in course of calcification, as in children from the ages of ten to fifteen, and which, as had been mentioned by Dr. Miller, could later be filled with something more substantial than phosphate of zinc.

Dr. Belcher capped whenever he could with fair promise of success. Capped exposed pulp in the decideous invariably.

Adjourned, to meet at the office of Dr. Saunders.

DENTAL LITERATURE.

To recapitulate: It has been shown that the character of our dental literature has improved in its scientific character in the last seven years.

That the subjects treated are not excessively practical, and the topic most considered during that time is not one fraught with the greatest good to the greatest number.

That the bulk of writing is done by graduates of dental colleges only.

That the number of active workers—doing much of such work—is exceedingly small, and out of all proportion to the large number engaged in dental practice.

And that the road to improvement lies in admitting men imbued at the outset with a desire for educational advancement.

In conclusion, I trust that those who have been reading with the blissful feeling that they were progressing will reflect upon the points I have mentioned, and will remember that if our journals do not bring us new facts in the future, the fault is not with the editors, but with ourselves.—FAUGHT, *Independent Practitioner.*

A PLASTIC FILLING.

IT was not my intention to have it understood that my contribution was to be an essay on the subject of plastic fillings in general, nor, indeed, an essay at all, my only desire being to bring to the attention of the profession a plastic filling which I have been using for some time with such satisfaction to myself that I am anxious to give the profession the benefit of lt ; as much "*Pro bono publico*" as "*Pro bono professiones.*"

I do not claim entire originality in the matter, and it may be that some of you have already used it, but I am sure it will be new to some and worth trying again by those who may have used it before ; and even if condemned by the latter, I shall be none the less satisfied with what it has accomplished in my own practice, and none the less convinced that, in its place, it is a good thing.

I may remark just here that any filling material used without judgment as to its proper place under varying conditions may prove of no value.

To be brief and to the point, the material of which I speak is composed of amalgam and oxyphosphate of zinc in proportions not fixed, but varying according to the case in hand. I first mix the amalgam just as I would for an amalgam filling, save that I do not express the mercury unless the excess is considerable. I then mix the oxyphosphate quite thin, and quickly incorporate it into the pellet of amalgam, working it thoroughly with a very stiff spatula. I then roll the pellet between my thumb and finger and immdiately introduce it into the previously dried cavity, press into place and burnish to the edges, trimming the excess with a burnisher.

I claim for the filling that it combines the best and most desirable properties of each material, and eliminates to a large extent some of the most objectionable features of both.

The spheroidal tendency of the amalgam, by which a slight crevice so often appears above the edges of such fillings, is entirely overcome by the presence of the cement, while the solubility of the cement is almost, if not entirely, counteracted by the stability of the amalgam. The compound does not set so quickly as the cement alone, but much more quickly than amalgam. When hardened, it takes a metallic finish under the burnisher, and it is sufficiently hard in five minutes to be burnished.

The thermal conduction is less than that of amalgam used alone, and altogether it seems to be more compatible with toothbone than is amalgam.

We frequently meet with cavities in molars and bicuspids located upon the distal, buccal or palatal surfaces, large and superficial, with no lateral walls in which to make retaining grooves, or perhaps with one wall broken away and the cavity so out of reach or so sensitive that extensive excavation is impossible. Amalgam in such a place is out of the question, and oxyphosphate, owing to its temporary character, is also objectionable, but it is the only thing we can rely upon to stay in such a cavity. Doubtless, under such circumstances as this, we have all wished again and again for a material that would both adhere to the walls and be lasting.

These are the cases wherein the composition filling is pre-eminently indicated.

If the cavity is so shallow as to require a filling more of the nature of a cement, I use a greater proportion of oxyphosphate. If the cavity is deep enough to be slightly retaining in shape, for the sake of the greater stability of the filling, I introduce more amalgam than cement.

Where the cavity involves the masticating surface, I cover the exposed face of the filling with pure amalgam, thus presenting a more resistant surface to the attrition of mastication. The amalgam in such a case adheres without difficulty, and becomes a part of the filling.

For some time I confined the use of this material to the class of cavities of which I have just spoken, but as I became more confident of its efficiency, I have gradually extended the field of its usefulness, until now I use it in nearly all approximal cavities, which

I would otherwise fill with amalgam. My experience with it convinces me that it is more reliable in approximating cavities than amalgam.

One case—more marked, perhaps, than any other—I will relate. The case is that of a lady whose teeth have been under my care over five years, and during that time I have repeatedly filled her superior bicuspid teeth. They were largely decayed when I first saw them, and I filled them with amalgam. The quality of the teeth was very poor, and in a few months refilling was necessary, when the teeth could no longer be filled with amalgam. I resorted to oxyphosphate cement, but this proved quite soluble in the fluds of the mouth, and had to be frequently renewed. Two years ago in July I filled these teeth with amalgam and cement mixed together as I have described. I saw them a month or two ago, they were in excellent condition.

I find this mixture useful in setting Bonwill's crowns. The post may be set in the root with the mixture ; then the crown filled with pure amalgam and pressed down upon the plastic root filling, and packed against it with an instrument through the crown opening and the operation finished with amalgam, or the mixture may be used throughout the entire operation.

I also use the mixture for filling approximal cavities in deciduous teeth. It is more quickly introduced than amalgam, and does better service than either amalgam, cement or gutta-percha.

Gentlemen, I present this mixture to you, in the hope that you will give it a trial, and report at our next meeting what the result of your experlence has been. No doubt some of you can improve upon the method of mixing or using it. If so, I want the benefit of your experience and improvement. I know, from what I have seen of it in five years' constant use, that it is a valuable servant, and can be made to do good work. I am satisfied you will find many places to put it, and the more you use it the more you will like it.—Tileston, *The Dental Review.*

AN OCCASIONAL EXPERIENCE.

The fact that the American women, as a general thing, are opposed to large families—and perhaps not without reason—may account for the success of those who sell nostroms to abort issue—if such nostrums exist, which is very doubtful. This reminds me of a case where a lady applied to a practitioner for treatment. She was about five or six months pregnant. The doctor, on examining, concluded to give her the usual thing, a few drops of McMunn's elixer of opium, and told her to lie in a recumbent position. Notwithstanding the treatment, the patient aborted a day or two after, and upon recovery, the doctor was sued by the husband for malpractice. The astonished doctor defended himself, and it came out on the trial that the woman had been cleaning house, carrying water up and down stairs, lifted a trunk and moved a stove, and perhaps did some things she did not tell of. However, the case fell through. The woman had deceived her husband and her own doctor, and the husband was silly enough to commence a suit. But the law she did not fool, and the husband paid the costs. The amount of money paid yearly to avoid issue is something enormous. The permanent injury to health every practitioner knows, but the husband does not. Therefore, when a pregnant woman applies to me to have a tooth removed, if she be in a fair condition of health, I take it out, and in more than two thousand cases I have never known of an injury resulting. A few days ago a gentlemen came to me with his wife and wanted a tooth removed. She was pregnant about six months. The usual talk was gone through with : " Will it hurt her ? " " Is it dangerous ? " etc. I said : " My dear sir, if I thought it involved any danger, it would be I that would think of it, and not you. I do not know of a single authentic case of preter-natural labor being caused by the extraction of a tooth. There are some cases reported, and some of the professors have said something about the danger of the practice, but in all of these cases the dentist has not known anything of the antecedent causes that might exist " I concluded my conversation by taking out the tooth, and said to the aforesaid husband : " If the taking out of a tooth of a pregnant woman would cause her to abort, the dentist could at once stop all other practice, for his parlors would be filled nearly all the time with patients who would pay him a better price for that than for any other branch of work that he could do."—JAW-BONE, *Dental Advertiser.*

NATIONAL MEDICAL MUSEUM—ITS WANTS.

" I HAVE time for only a very condensed statement of the wants of our National Medical Museum. In the first place, it needs the intelligent interest and friendship of the medical profession of this country. To a very considerable extent it has had this. Were it otherwise, it would not be what it is nor where it is. But it needs more of it, and it can never have too much. Every medical man in this country should help a little, and provide for the perpetuation of his name as that of a physician interested in the progress of the profession, by sending at least one specimen to it. It is omnivorous in its demands for material, as will be seen by the circular which it has recently issued. But I will name as special wants human embryos, especially those of a very early age; monstrosities and malformations of all kinds in man or in the lower animals; results of old injuries, such as fractures or dislocations, or of surgical operations, such as excisions, stumps, etc.; injuries and diseases of the eye, ear or nose; new growths of all kinds; diseases of the brain and spinal cord; and specimens illustrating the condition of bones, joints, brain, larynx and other organs in extreme old age.

"In the second place, it needs a regular supply of funds from the general government. To form and keep in proper condition such a medical museum as this should be is a more difficult and expensive matter than those not acquainted with such work would suppose, and the gifts of specimens from the profession must be supplemented by ample means for the preparation, preservation and proper display of these specimens, and also for the purchase of apparatus and typical specimens of foreign work, in order that the museum may be always able to show the latest state of knowledge and the best ways of doing things.

"The annual appropriation for the museum at present is $5,000. This is sufficient, except that the printing of the catalogue, of which I shall speak presently, must be an extra charge; but the medical profession should see to it that the amount is not reduced in the rhythmic spasms of partial economy with which some of our statesmen are afflicted.

"The third need of the museum is a series of the right kind of descriptions of its specimens, given on labels and in a catalogue. Unaided by such descriptions, it has for each man that which he can see in it and no more. One man will see nothing but an old piece of bone, a shapeless mass of tissue bleached by alcohol, a case of old, dingy brass instruments. Another will see in the same things a rare joint atrophy, implying curious abnormal nerve influence; a leprous nodule, whose history, if we knew it, would reach back through the lazar-houses of the middle ages to the far East, and whose bacilli may be the lineal descendants of those that vexed Nathan, the Syrian; a case of microscopes, illustrating the development, from the first rough iron tube of the spectacle-maker of Nuremberg to the delicate and complicated instrument through which we now peer curiously into that world which lies within the world of unassisted vision. By our labels and catalogues we must tell men what to see, but to do this we must first see ourselves. The aphorism that a first-class museum should consist of a series of satisfactory labels with specimens attached means a good deal. Something has been done in this direction, as you will see on inspection of the cases, but I often wonder what sort of labels a man who has spent years in investigating the normal and abnormal structure of one organ would write for our specimens of that organ. Such help as this we need—kindly, truthful criticism, the pointing out of errors, and of new points of view for this mass of material.

"We also need a series of printed catalogues. One of these should be in the form of compact hand-books relating to particular sections of the collection, and intended partly for the use of visitors while in the museum, and partly as a ready means of letting distant friends know what material it needs in different departments. It should also print a complete illustrated catalogue of the whole collection, for the use of the investigators and teachers of the profession. Congress has been requested to grant authority for the printing of such a catalogue by the government printer. The material for it is nearly reaby, and it would make three volumes, each the size of one of "The Medical and Surgical History of the War of the Rebellion."—BILLINGS, *Science.*

A QUARTET OF SOCIETIES.

The Union Convention of the Fifth, Sixth, Seventh and Eighth District Dental Societies will be held at the Leland Hotel, Syracuse, Wednesday, Thursday and Friday, October 24, 25 and 26. The following programme has been arranged :

WEDNESDAY.

Prayer—George B. Spalding, D. D.
Address of Welcome—President B. T. Mason.
Response—Frank French, M. D. S.

PAPERS.

1. "The Status of Dentistry." Drs. Norman W. Kingsley and W. A. Barrows.
2. "Chemistry an Important Factor in Dental Education." Drs. George Archbold and I. C. Curtis.
3. "The Abnormity of the Dentist's Eye." Drs. John Van Duyn and Frank Abbott.
4. "The Comparative Value of Metals for Base Plates." Dr. A. M. Holmes.
5. "Dental Ethics." Dr. H. A. Birdsall.

6. "Dentistry in Its Relation to Medicine." Drs. H. D. Didama and W. C. Barrett.

7. "Medicine in Its Relation to Dentistry." Drs. Edward B. Angell and S. B. Palmer.

8. "Facial Angle in Relation to Construction of Artificial Dentures." Dr. C. T. Howard.

9. "The Care of the Deciduous Teeth." Drs. C. F. Wheeler and Charles Barnes.

10. "Mouth Breathing—Cause, Effect, Treatment." Dr. Frank B. Darby.

11. "The Early Diagnosis and Treatment of Tumors of the Jaw." Dr. Nathan Jacobson.

12. "Dental Medley." Drs. W. H. Dwinelle and L. W. Bristol.

13. "Studies of Pyorrhea Alveolaris." Dr. M. L. Rhein.

14. "Vulcanizing." Dr. A. P. Southwick.

15. "Dental Education." Drs. J. Taft, E. T. Darby, W. Xavier Sudduth, Truman W. Brophy and Thomas Fillebrown.

16 "The Pathological Condition of the Mouth Due to Artificial Dentures." Dr. C. S. Butler.

Demonstrations by Drs. E. T. Starr, New Electrical Appliances; H. A. Parr, Parr's Removable Bridge: Frank Abbott, Demonstrating use of Abbott Automatic Mallet; G. P. Reshel, Reshel's Vulcanizer; W. C. Barrett, Dental Engine, Fan Ventilator, Corrundum Disks; will exhibit specimens of Ancient Etrurian Dentistry, 750 B. C.; A. M. Holmes, Holmes' Matrix; S. E. MacDougall, Obturators; G. L. Curtis, Curtis' Removable Bridge, Cystic Tumor of Jaw; George W. Melotte, Porcelain Tips, Restoring Abrasion of Teeth with Porcelain (own method); R. C. Sunderlin, Pneumatic Plugger, Blow Pipe and Gold Plates (own method); M. H. Fish, Obturators; R. Frank Jones, Dental Vibrator: Frank B. Darby, Paper Canal Points, etc.; Truman W. Brophy, Brophy's Matrix; F. A. Greene's Gas Generating Blow Pipe: C. A. Retter, Continuous Gum Bridge.

Clinics by Drs. F. A. Greene, Gold Crown (own method); W. W. Walker, Immediate Root Filling; J. S. Marshall, Oral Surgery; C. C. Carroll, Casting Aluminum Plates; C. W. Stanton, Obtunding Sensitive Dentine with Nitrous Oxide Spray, Capping Exposed Pulps; E. L. Sargeant, Crystal Gold Filling; G. H. Butler, Logan Crown; William H. Hall, Porcelain Tips, employing the Land Furnace; A. Retter, Obtunding Sensive Dentine with Ether Spray; W. C. Stewart, Restoring Contour of Molar with Gold, using the Perry Separator; Electro-Magnetic Mallet and Electrical Engine, power from Detroit Electric Motor.

Exhibits by The S. S. White Dental Manufacturing Co., represented by G. L. Primrose; Buffalo Dental Manufacturing Co., Dr. Theo. T. Lewis; Claudius, Ash & Sons, London, Eng., J. M. Atkinson: Rochester Dental Manufactory, George P. Davis; Keller Medicine Co., Fort Wayne, Ind., J. P. Reifel; Brooklyn Dental Co., Brooklyn, J. M. Atkinson; Welsh Dental Co., Philadelphia, W. H. Carew, Jr.; The Wilmington Dental Manufacturing Co.; Johnson & Lund, Philadelphia, John C. Lund; Florence Manufacturing Co.; Wm. M. Speakman; Detroit Motor Co., Detroit, Mich., A. A. Robinson: The New York Dental Manufacturing Co.; J. W. Ivory, Wm. P. Green, C. W. Munson, American Dental Manufacturing Co.

Dentists are requested to invite their wives to accompany them to this union convention.

An effort to make this meeting a memorable social occasion is demonstrated by the appointment of a Ladies' Reception Committee, who will be present at the regular sessions of the convention, to receive and introduce the ladies, and otherwise look after their comfort and pleasure. Also, to assist Mrs. Charles Barnes on the evening of the reception.

Mrs. Barnes will receive the ladies at her residence, 51 West Genesee street, on the evening of October 25th, at 8.30 o'clock.

Business meetings of the respective societies will be held immediately on adjournment of the first session.

"ALMADINA"—A NEW GUM.

Under the various names of "Almadina," "Potato Gum," "Euphorbia Gum," or, more shortly, "E. G.," a peculiar resin of African origin has been of late years gradually finding its way to the European drug markets in gradually increasing quantities. Hitherto its chief, if not its only, use in the arts has been as a "substitute" for or addition to India rubber, and, we learn, it is not only much cheaper than caoutchouc, but actually improves the latter when added to it in certain proportions. Among the advantages over pure caoutchouc which mixtures thereof with "E. G." are said to possess not the least are diminished porosity and greater durability.—*Scientific American.*

DRUG STORES IN GERMANY.

The drug stores have a curious way here of shutting up just about the time you want them. And as soon as it begins to grow dark down go the shutters, and if you need anything, you go to a little bell handle outside of one of the iron shutters and ring it. Then you hear some one at a crank inside, the massive frame rolls up and a head looks out of the window. Finally the man or boy inside opens part of the window, and you talk through a pane of glass and make known your wants. Instead of getting angry at being aroused, the man begs your pardon for keeping you outside, and says: "I thank you for your order." If you have not the exact change and the man inside is in the same predicament, he will beg you most politely and thank you to allow him to change it. Having done so, he will thank you for calling (evidently taking the visit as a social one), bow, close his little peep-hole, bow again, and then smile sweetly as he grinds down his iron shutter, and his smiling face is lost to view. How different from the druggists in America! I remember I once woke up one in the States, and he came down stairs with a shotgun after me. But, as I remarked before, they have a eurious way of doing things in Dresden"—*Exchange.*

A GOOD THING—FOR THE BOYS.

Thaddeus P. Hyatt writes us as follows:

The Students' Society of the New York College of Dentistry was organized in November of 1887 by a few junior members of that college.

It is now approaching the beginning of its second year of existence, with every prospect of efficiency and success.

Its membership, both active and honorary, now includes upwards of one hundred men, while new members are being constantly received.

As this is the pioneer society (such is my belief) among dental students in America, I write to inform you of this advance step in the study of dentistry.

The society gives the student opportunity for comparing with his fellows ideas and methods, trains him in accurate and scientific statements of facts, and, by the feeling of equality, permits him to freely advance and meet arguments; thus ln many ways preparing him more fully for the activities of professional life.

Enclosed please find a copy of constitution and by-laws.

Very respectfully,

THADDEUS P. HYATT.

WISCONSIN STATE SOCIETY.

The Wisconsin State Dental Society convened in Milwaukee on Tuesday, July 17th, and continued till Thursday, July 20th. Excellent papers were read and discussed. Topics of papers: "Root Filling," by Dr. W. H. Carson, Mineral Point; "The Matrix," by Dr. T. B. Fletcher, Portage; "Criticism on Bridge Work," by Dr. Charles C. Southwell, of Milwaukee; "The Deciduous Teeth; Their Care and Treatment," by Dr. W. L. Conkey, of Appleton; "A Consideration of the Minute Anatomy of the Teeth and Its Connections, illustrated by enlarged photo-micrographs," by Dr. G. H. McCausey, of Janesville; "An Unborn Idia; Hence Not Named," by Dr. Holbrook, Milwaukee; "Professional Fools and Their Follies," by Edgar Palmer, of La Crosse; "Hygienic Laws," by Dr. E. C. French, of Eau Claire; "Necrosis of the Sup. Max. Bones; A Case in Practice," by Dr. C. E. Willoughby, of Clintonville.

Prof. S. Talbot, of Chicago, Ill., lectured on the "Etiology of Irregularities of the Teeth," illustrated by drawings, Wednesday evening at 8 P. M. The doctor has made this subject one of peculiar interest. His views are different from the authors of the present day, and his ideas seem clear and possible. His work has extended over five or six years.

The following officers were elected for the ensuing year: President, Dr. W. H. Carson, of Mineral Point; First Vice-President. Dr. E. C. French, of Eau Claire; Second Vice-President, Dr. E. F. Long, of Black River Falls; Secretary, Dr. C. A. Southwell, of Milwaukee; Treasurer, Dr. B. Douglass, of Appleton.

Milwaukee was chosen as the next place of meeting.

C. A. SOUTHWELL, Secretary.

A GOOD OPENING.

Dr. Frank Latson offers for sale an excellent practice, in a thriving village with good outlying country, for a sum much below the cost of outfit and fixtures. For a young man of professional ability and good business habits this is an exceptional opportunity. Dr. Latson's reason for selling is paralysis affecting his eyes, and which necessarily incapacitates him for the further following of dentistry. Letters addressed to him at Rhinebeck, N. Y., will receive prompt attention.

PATENT RIGHTS, as well as copyrights, are productive of much injustice and subject to many abuses, but no reasonable man will argue from this fact that there is anything belittling or unprofessional in securing a patent right or a copyright. We honor the man who gives his inventions to his profession without price as highly as do any of our contemporaries, but we strongly deny that a dentist who secures a patent can, on that account, be called unprofessional.—*Western Dental Journal.*

Portable electric lights, to be hung to a coat button, are the new nvention for the benefit of readers upon cars. Thus each one can become his own lightning bug.—*Mechanical News.*

PELLETS.

Items of Interest pictures Dr. Harlan. Does it well, too.

French dentists are obliged to present a prescription when they wish to invest in arsenic.

The *Ornithologist and Oologist*, edited by Frank B. Webster, of Boston, tells all about birds and their eggs.

Dr. E. Parmly Brown has been demonstrating the practicability and beauty of all-porcelain bridge to English dentists.

In China the druggist who sells arsenic to a man who happens to use it for criminal purposes is flogged at the rate of eighty whacks per sale.

HELIOSTAT WANTED.—Any one having for sale a fiast-class instrument at a less than reasonable price, may find a purchaser by addressing this journal.

Patient : "The tooth next to that 'un aches, too."
Dentist ; "Yes, it aches in sympathy."
Patient : "Yank it out. Durn such sympathy."—*Sun.*

WANTED—A dozen copies of the Transactions of the Dental Society of the State of New York for 1869–90. Will send in exchange for each copy the ODONTOGRAPHIC JOURNAL for one year.

Joseph Zentmeyer, the famous Philadelphia maker of microscope stands and accessories, is dead. His sons, who are experts in the manufacture of the several articles to the perfection of which their father devoted himself and his means, continue the business.

The evening programme or the First District Society for October 1st called for a paper by Dr. Atkinson on "The History of the First District Dental Society."

Clinics and exhibits had been announced for the afternoon by Drs. Stowell, of Pittsfield ; Stockton, of Newark ; Sisson, of New York.

No root, no crown.

"And what, sir, may you be?"
"I'm a D. D. S."
"What's that?"
"Dental Dude, Sir."

The Odontological programme for October 9th announced "A Method of Combining Amalgam and Gold, Securing a Firm Union Between the Two and Completing the Filling at One Sitting," by Dr. D. M. Clapp, of Boston; and "Assimilation," by Dr. J. B. Lawrence, of New York.

The *Archives of Dentistry* presents its readers with a pair of full-page pictures of Dr. Abbott, President of the A. D. A., and of Dr. Catching, President of the S. D. A. The picture of Dr. Abbott is an excellent likeness, and presumably the same may be said of that of Dr. Catching. A brace of good-looking men.

Dentist: "Mr. Doppenheimer, you won't feel me pull the tooth. The gas will make you insensible."

Doppenheimer: "Ish dot so? Vell, I dinks I coomes to-morrer."

Den.: "But why not let me pull it to-day?"

Dop.: "Vell, I don' yoost know how much monish der wash in my pocked-book."—*Life.*

BOOKS, PAMPHLETS, ETC.

COCAINE DOSAGE AND COCAINE ADDICTION, and other papers. By Dr. J. B. Mattison. Pp. 44.

FOOTPRINTS OF A PROFESSION. By Dr. H. C. Meriam. Pp. 30.

A PRACTICAL TREATISE ON ARTIFICIAL CROWN AND BRIDGE WORK. With 500 illustrations. By George Evans. Pp. 263. Philadelphia: White Dental Manufacturing Company.

As stated in the preface, the subject is presented almost wholly from the practical standpoint, in the belief that the utility and esthetic advantages of crown and bridge work may be thus more readily made apparent to the practical men in dentistry. To this end, the various methods described are classified in systems, and their treatment is made as concise as their importance will permit. As a ready reference book for those engaged in the work in question, it stands alone.

THE
Odontographic Journal.

Volume IX.—*January 1889.*—*No. 4.*

HEADACHE FROM EYE-STRAIN.

A PAPER READ BEFORE THE MEDICAL SOCIETY OF THE COUNTY OF STEUBEN, JANUARY 8TH, 1889.

BY DR. WHEELOCK RIDER, ROCHESTER, N. Y.

Mr. President and Gentlemen :

That the symptom headache is of the greatest frequency few will deny. A large proportion of those seeking relief from the physician complain wholly or incidentally of headache, and devoid of danger as this disorder may be, its seriousness is by no means to be underrated; in the aggregate probably more hours of suffering are annually caused by headache than by any other painful affection; not infrequently it necessitates a retirement from occupation, or involves the loss of much time. Therefore, I trust a brief rèsumé of the causal relations of refractive errors to headache, followed by a few illustrative cases, will be of interest to you.

Headache is best considered as arising by the combined existence of a general predisposing condition and a local irritation. Whatever this general condition may be, how brought about, or how continued, it is essentially a deficient resistence on the part of the general nervous system against the exciting causes. The periodically returning headache becomes, therefore, a veritable nerve storm set up by the occasional inability to resist an irritation, which in many instances, is continuously existing.

Both the predisposing condition and the cause of peripheral irritation are often inherited, a clinical fact of real value. Consumption, neuralgia, paralysis, etc., prevail in the family histories of many of these patients, as does strabismus, asthenopia and other evidences of defective vision. Among cases illustrative of this hereditary tendency let me mention one in which the attacks were very frequent, regularly recurring, severe headaches, accompanied generally by nausea, and the individuals affected were : mother, three sons, one daughter, two grandsons, and two granddaughters; in all the attacks were of a similar nature.

A word regarding supposed causation. There is rarely such uniformity among the laity in medical matters as is found in questioning these sufferers as to the supposed origin of their attacks. If it is not the liver to which the trouble is attributed, it is the stomach. Aside from the clinical evidence to the contrary it is extremely improbable that either of these organs can so universally be at fault. The idea arises in all probability from the observation that gastric function is imperfectly performed, and that vomiting frequently occurs during attacks. Much as in sea-sickness, the symptom so prominent is an effect, yet popularly the suffering member is credited with the offence. On the other hand the liver is a good scape-goat, its condition cannot be easily demonstrated; appearance of bile in the stomach-contents, resulting from prolonged vomiting, might also give rise to the belief that a disordered liver is the exciting cause.

Considering briefly the symptoms of sick headaches, it will be noticed that the special senses are abnormally acute; slight, and especially unpleasant odors are recognized with unusual promptness, hearing acuity is intensified, or rather, there is apparent hyperæsthesia rendering loud sounds very painful sometimes, and photophobia is very commonly present. Along with hearing may be mentioned the naturally associated vertigo, and subjective noises. Position most generally assumed therefore in severe attacks, is the horizontal one, in a darkened quiet room.

These few points are taken as bearing especially upon the particular cause I am to consider. Their incompleteness is, therefore, excusable. Let me recall briefly to your mind some matters in the physiology of vision :

During waking hours the eyes are at no time at rest ; their eighteen muscles demand innervation sixteen hours daily. The slightest inequality of tension of the muscles governing the motions of the eyeballs produces marked discomfort, if uncorrected, double vision and vertigo, for the image of every object viewed, must, to be a clear one, fall directly upon the yellow spot of the retina; when both eyes are used—upon corresponding points. The smallest variation from the proper tension of the ciliary muscle on the other hand is productive of an indistinct image upon the retina, to avoid which, no effort seems too great.

In the normal eye, only parallel rays of light, those coming from a distance of about twenty feet or more, are focused on the retina. All clearer vision of nearer objects is the result of a greater or less amount of accommodative effort—the contraction of the ciliary muscle. But in viewing such near objects the visual axes cease to be parallel—the axes of vision converge toward each other—and this convergence of the visual axes sustains a definite relation to the amount of accommodation required for the given distance. An object at one foot requires a certain amount of effort of the ciliary muscle and a corresponding amount of effort of the internal recti muscles. At two feet both are changed in degree, but the same relation still exists. Nowhere else in the body is such exact relative muscular effort, such delicate adjustment required, and as habitually practiced.

The organ of vision in its more highly developed form, is the only organ in nature where perfect functional activity depends upon exact form—this is by reason of its dependence upon the laws of the refraction of light. The leaves of a plant or the teeth of an animal may be longer or shorter than the average and still each may be functionally perfect. An eye that is longer than the focal length of its refractive media is near-sighted and unable to conform completely to the requirements of the vertebrate eye. When too short it is over-sighted; here it can only be effective by exercising an effort of the ciliary muscle for distant vision—where the accommodation should physiologically be relaxed, and by excessive strain of the ciliary muscle when it is used for near objects. When irregularly curved, or where the ciliary muscle is irregularly exercised, its vision can be perfect only in exceptional cases. This latter condition is astigmatism.

Knowing as we do, the tendency to variation of form in nature, is it to be wondered at that abnormal optical conditions should so frequently be found, especially as we are able to put the eye to such a searching examination, that the slightest errors become manifest? As a matter of fact less than eight per cent. of a large number of eyes examined, were found by Randall strictly normal, optically.

Bearing now in mind the relation between convergence of the visual axes and accommodation, we see that hypermetropia at once introduces a disturbance of these relations. In distant vision with parallel axes the hypermetropic eye must accommodate—but parallelism and accommodation do not go together physiologically. In vision of near objects, also, as is readily seen, accommodation out of proportion to convergence exists, and the reverse obtains in myopia.

In the condition of regular astigmatism, one meridian is optically correct while another is not, or, both are at fault in different degrees, and the effort which corrects the one cannot correct both. All meridians cannot at once comply with the inviolable laws of light, excepting by an irregular contraction of the ciliary muscle—a feat of endurance.

In simple over-sight, then, the individual must :

I. Overwork constantly the ciliary muscle.

II. Violate at all times, the relation of convergence and accommodation.

When the patient has eyes of unequal refractive power—if he attempts binocular vision, he must be constantly striving to do what is next to impossible; correct at once, with the same force, eyes requiring different degrees of correction, else he must combine in the visual center a clear and an indistinct image.

In the case of astigmatism the individual is in a constant perplexity. No one effort of the ciliary muscle corrects for all meridians, and so this annular muscle is either obliged to contract irregularly or be constantly fretted by the demands made upon it. The convergence—accommodation relation is here also disturbed as is readily seen. The practical truth of these statements is nicely illustrated by the common defect of convergent strabismus. This, in the majority of cases, is a result of oversight or of defective vision of one eye. In the former case, the effort of the convergence-accommdation relation becomes so arduous that binocular vision is surrendered, as a lesser evil. If vision of one eye be markedly defective the organ is put in the direction of least resistance, and out of the way.

The patient never having enjoyed vision which is normal in acuity or ease, is generally ignorant of his defect. This is absolutely true in the majority of cases, though at first glance improbable.

Assuming now that a relation exists between the generation of nerve force, and its consumption in the exercise of duty of the parts of the organism, it would follow that an abnormal organ demanding, as it would, increased expenditure of nerve force to insure its physiological activity, would introduce an element of disturbance in supply and demand—and that where the demand exceeded the supply, symptoms such as headaches or neuralgias, might be developed as reflex symptoms of peripheral irritation.

The eye seems to be especially apt to introduce this disturbance by reason of prolonged constant use made of it, its tendency to fall short of its anatomical requirements, and the extreme nicety of adjustment demanded of it. As a clinical fact, however, defective teeth are a frequent cause of reflex irritation, and this appears to be more generally recognized in every-day treatment. So good an authority as T. Lauder Brunton states:* "The chief local causes are decayed teeth and abnormalities of the eye." He narrates the case of a professional man who went upon a continental tour seeking relief from a headache incapacitating him from work. On his return, percussion of his teeth revealed one slightly carious and treatment of this immediately gave relief. In several of my own cases a relapse has been found to have resulted from the irritation of carious teeth of themselves painless, but the cause, in strict truth, of toothache in the back of the head.

Case I. Emma B., 21 years. Headache during childhood and school years. Gave up school because of headaches. Discovered while a child that glasses improved vision, and wore her mother's spectacles to improve her sight evenings, but her severe headaches were unaffected. Headaches are now developed during the day; pain across forehead and through temples. Nausea always, vomiting sometimes. Has been occupied six years in various departments of book-bindery Sick-headaches several times a week, lately daily. Never suspected eyes to be the cause of headache. No asthenopia during the day, only by artificial light.

Vision right eye, 16-30, vision left eye, 16-80. With the ciliary muscle paralysed by a two per cent. solution of homatropine and cocaine, vision right eye, 16-50, vision left eye, less than 16-200.

Vision right, is 16-16 when corrected by + 2.75 s. ⊃ + 1. c. 70°.

Vision left, is 16-16 when corrected by + 1.50 s. ⊃ + 1.25 c. 95°.

These lenses were ordered for all close work; complete relief has followed for the six months which have since passed. On one occasion, when deprived of her glasses for three days, a return of headache, severe in character, was noted.

The patient, whose history I now give, seems to have suffered severely from as slight a defect as is usually met with.

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*"On the Pathology and Treatment of Some Forms of Headache." St. Bartholomew's Hospital Reports, Vol. XIX, 1883.

Case II. C. N. W., 21 years, has always had headaches; remembers the interruptions in going to school when five or six years of age by reason of their occurrence. Attacks begin with blurring of vision, shortly followed by intense pain through temples and in occiput, with nausea and frequently vomiting. It matters little to what use the eyes have been subjected, whether to distant or near vision. Latterly he has wakened with headache. Pain will invariably follow an hour's close application. In driving along a country road the train of symptoms, as like as not, will set in and he will be obliged to get out of the carriage before vomiting begins. The most effectual treatment which he has discovered is the recumbent posture in a darkened room, with mustard foot-baths, and ice-bags on the head; has been confined many days at a time in this manner. He has consulted numerous physicians, but with no relief and has given up the study of a profession as impossible.

Was examined March 30, 1888. Vision 16-24 normal, with + .75 c., right 30°, left 150°; these lenses were ordered for constant use.

Four weeks later I found he had worn glasses with the greatest relief; had read six hours without producing discomfort; distant vision was steadier and head felt uniformly better. In a letter received from him eight months after he was first examined, he states: "It has now been five months since I have had a headache and I have had but three light attacks since I have worn the glasses." I may state that no other treatment was undertaken.

This patient believing his eyes normal and his liver rebellious had instituted a habit of diet marked by its frugality, which he believed to have lessened his attacks. Armed with his glasses I presume he is now omnivorous.

Case III. Mr. H., a lawyer, about 45 years old, and in good general condition, became subject to attacks of headache about ten years ago. Both frequency and intensity gradually increased. The headache was liable to set in at any time, especially after close use of the eyes or after a walk in the bright sunlight, and the duration of an attack was variable. Nausea and vomiting later became prominent features in the case. Recumbency in a dark room with ice-bags on the head served to give some relief. His business was seriously interfered with and medical treatment had been of very little benefit, excepting to mitigate the severity of pain during attacks.

His eyes were examined in May, 1887. He was found to have a slight degree of astigmatism in the right eye, but a marked degree in the left one; the following correcting glasses were ordered for constant use:

Right eye, + .50 c. 90°.
Left eye, + 2. c. 90°.

During the twenty months which have passed since he began the use of glasses, he has not had a headache. No other treatment has been employed. Premonitory symptoms have appeared when at various times he has forgotten to put on his glasses before dressing in the morning.

This case exhibits a feature seen in many others, viz., the attacks were readily brought about by exposure to bright sunlight and sun heat. I have met with patients who referred the onset of their trouble to "slight sunstroke," and who thought themselves suffering from repeated mild insolations.

CASE IV. This case occured in the practice of my friend, Dr. C. A. Dewey, who in sending the patient for examination furnished me the following notes:

"Kate D., 23 years old, single. Mother had paralysis at the age of 36. Has never been thoroughly well; had series of about 30 abscesses before the 18th year, which have scarred the left side of her neck. Seven years ago had rheumatism in ankles and wrists. Menstruated at 21, regularly; some pain in back and in ovarian regions. Bowels regular, urine normal. As a child was kept from school by sick-headaches. *Has always had neuralgia in right eye and forehead. The greatest length of continued freedom from this pain has been but a few weeks.* Uterus low, retroflexed, bound down by adhesions."

I found on examination April 24, 1888, vision nearly normal. Under homatropine mydriasis, the following glasses were found necessary to produce normal vision:

Right eye, + .50 sph. ⊂⊃ 1. c. 90°.
Left eye, + 1.25 sph.

Ordered for constant use:

Right eye, + 1. c. 90°.
Left eye, + .75 sph.

For close work a weak prism (2°) was afterwards ordered in combination with the above, base inward.

This case is characteristic in that the pain was persistently located over and above the astigmatic eye. In the prescription an allowance for accommodative tension was made as is frequently desirable by omitting .50 D. sph.

This patient is of an extremely nervous disposition ; largely confined indoors, and a recent attack of neuralgia had lasted several weeks when she was examined.

In this case the constant effort to correct a congenital optical defect induced the constant neuralgia of the ophthalmic division of the trifacial. No medication was used, the only other treatment being, latterly, application of a pessary.

Patient now is unable to dispense with the correcting glasses without evidence of the return of the habitual pain. Her efforts to obtain relief had been constant, but fruitless ; no examination of the eyes had been suggested by the many physicians whom she had consulted, nor had she ever suspected defect of vision.

CASE V. Fannie M., 18 years, student. Headaches since earliest recollection. Severe sick-headaches brought on by any slight nervous excitement or close work ; the excitement of attending places of amusement, receptions or in entertaining company provoked an attack ; always considered delicate. No physician had ever suspected eye-strain. Two years ago suffered an extension of trouble down into neck and shoulders with pain and stiffness of these parts. At one period lost a number of days weekly by reason of her trouble, discontinued school for two months for same cause. For two years has had headaches daily, rarely vomiting, but nausea not infrequently. Pressing pain in vertex and across forehead ; a tender spot on vertex makes combing of the hair painful.

Vision, each eye, 16-16 ; under homatropine, vision sub-normal ; + .75 c. 90°, each eye, perfects it. Has had no further trouble in about six weeks following correction of the slight hypermetropic astigmatism. Occasionally wakes with headache which disappears shortly after putting on glasses. Has had a few repetitions of the trouble, but only when the glasses were not worn. No other treatment.

An uncorrected error of refraction will produce localized tenderness in various parts of the surface of the head. The wearing of weak convex cylindrical glasses, unsuited to the case, often produced in a few hours extreme tenderness in the center of the forehead, in a patient that came under observation. I repeatedly produced it.

I think the following case is interesting in view of the slight optical error which has produced such life-long discomfort.

CASE VI. Mrs. P., 24 years married, no children. Examined Feb. 18, 1888. Has been subject to a slight constant headache since earliest remembrance, location is described in my notes as "all over the head, sometimes above forehead." Has always considered her eyes perfect, excepting, when as she thought, the headaches of unusual severity caused a blurring of vision. Vision both eyes 16-12, accepts on a preliminary examination a weak convex lens (+ .50) under homatropine, vision slightly sub-normal, raised to normal in each eye with + .50 c. 90°. This was ordered for constant use. They have been worn nearly eleven months ; vision with them is no sharper than without, in both cases being perfect, but ease of vision with the glasses is marked. The relief from constant headache was immediate and permanent.

In such cases as this it might be suggested that relief followed correction, by chance only ; that the conclusion is not reached by insufficient induction is shown by ordering discontinuance of the glasses—pain is found to return in the habitual manner. This was once the case in my office while this patient was awaiting examination of a sister with a similar complaint. I removed the glasses for another patient's use ; when I returned them a short time after, she assured me that her head was aching.

Case VII. F. A. P., 35 years, groceryman. Is sent for examination by family physician, with a history of intense pain in head associated with vertigo. Trouble has existed nine months. It begins usually, not always, after close use of eyes, with blurring of vision then intense pain and *such dizziness as to cause a staggering gait, simulating intoxication if patient walks in the street.* No nausea. Never noticed defective vision.

Under homatropine, vision right, 16-40 ; left, 16-80. Vision normal with + 1.50 c. 90° each eye. With this correction for close work only, *absolute and immediate relief for 21 weeks.* An occasional headache, not at all severe, now appears, and the patient is at present under observation. Either further correction is needed, or dental or other irritation is present.

No thorough examination of the refraction can be made in persons of an age under 40 years, without previously paralysing the accommodation. If this be left undone the results may be in some cases correct, are in many entirely misleading—in all, doubtful. The involuntary contraction of the ciliary muscle being the only element of uncertainty, as soon as it is eliminated, the problem becomes a very simple one. Small convenient test-cases of lenses are sufficient to enable any physician to establish beyond doubt refractive errors in such cases as come under his care. Many instances occur where special experience may be needed, however, to properly correct them.

This whole subject is no novel one; but it may be that of late it is being more habitually recognized by the profession, and neurologists especially. Brunton states, "In treating any case of headache, the first thing to do is to see whether the teeth are sound and the eyes normal." Again, "It would be going too far to say that frontal headache is always due to an abnormal condition of the eyes, but I believe it is so much more frequently that one would at all suspect."

The satisfaction with which I consider a considerable series of cases, of which I fear I have here detailed too many examples, is only equaled by surprise that the true character of the trouble has been recognized in so few instances; not until almost all other means had been tried over and over again.

To formulate briefly the subject-matter of this paper:

I. It matters little what be the occupation, sex, age or apparent perfection of vision of a patient, the eyes may be the cause of the headache or neuralgia, and the burden of proof lies on the other side of the proposition.

II. If an optical condition requires such effort, with its resulting irritation, as to produce the reflex it must be completely relieved, bearing in mind that a mydriatic is necessary in examination, and then the cure will be brilliant.

III. The most common origin of reflex irritation from eyes is oversighted astigmatism. The recent statement of a noted French authority, in publishing a series of several hundred of these cases, goes, as far as I can learn, unchallenged: "Astigmatism should be regarded as an almost universal cause of migraine."

IV. Blurring of vision at any time during an attack should immediately lead to an examination of the eyes.

V. The predisposing condition may be overcome, but for time being only. The local irritation, if eye-strain, can be overcome; and this is permanent.

This may all be familiar ground to you. If so, you can pardon the enthusiasm which leads a prominent neurologist to say, "I have never seen a case of typical sick-headache where the eyes themselves, or the eye-muscles, were not at fault."

THE BASIS OF DENTAL LEGISLATION.

I am not here saying that our present dental legislation is evil. I am not discussing the goodness or the badness of the existing laws. I am concerned only with the basis on which they should rest,—their proper moral and intellectual foundations. If I have correctly presented this basis, then (1), the *motive* of our legislation is bad—is unworthy of our profession; and (2), the rationality of that legislation has not been shown. Nevertheless, the legislation itself may be beneficial—by accident. Its moral basis is indefensible. Yet perhaps, as the desire of the Turks for plunder resulted in good to Germany and indeed to all Europe, as the selfish ambition of the Saxon Maurice advanced the cause of free thought and benefited mankind, so here a selfish motive may result in good to the nation. Its intellectual basis is—well, it is *wanting*; the reasoning whereby our laws are upheld is in startling contrast with that of Euclde. Yet perhaps, like the old woman who saved Rome by leaving her flock of geese in the meadow, the legislature may have accidentally done the country a service; it may, to use the polite expression, have "builded better than it knew." But even if our dental laws should prove, under criticism, to be scientifically correct, it remains palpably true that a people which is incapable of properly choosing its own dentists is, *a fortiori*, incapable of correctly choosing its own legislators; that the evils wrought by poor dentistry are as nothing compared to those wrought by the transmission of syphilis, either through contagion or through heredity; that pure science has a far higher claim to governmental recognition than any form of applied science; yet pure science receives no protection (for, while the relatively-poor nations of Europe have given public encouragement to a Descartes, a Galileo, a Columbus, a Newton, a Leibnitz, a Lagrange, a Laplace, a Macaulay, a Gibbon, a Davy, an Arago, a Lavoisier, a Hamilton, and to a multitude of other truth-seekers from Tycho Brahe to Koch, the richest country of the globe has done next to nothing for the advancement of discovery), and he who calmly considers these things is forced to conclude that the legislature has occupied itself with the "mint and anise and cummin" of legislation—that there are "weightier matters," of which it might be said, "These ought ye to have done, and not to leave the other undone."—DEAN, *Dental Cosmos*.

THE ETHICS OF MEDICAL VISITING.

The publication, in a recent number of the *Western Medical Reporter*, of a lengthy correspondence between Mr. Lawson Tait and Dr. D. A. K. Steele, of Chicago, who had been denied admission to the former's operating room, suggests the questions, "What are the ethics of medical visiting?" What are the privileges to be accorded a visitor; what may a surgeon refuse, and be within the elastic pale of "ethics?" What are the privileges of "natural selection" to be accorded a much used, and, perhaps, a much abused surgeon like Mr. Tait? The ordinary surgeon generally finds it no inconvenience to admit to his clinic persons recommended, if due notice is given of their coming. Abdominal operations are, however, out of the ordinary, just as much as Mr. Tait, by reason of his position and prominence, is out of the ordinary. The attention he has received, favorable and unfavorable, from those who have chosen to visit and criticize him, is also out of the ordinary. The attention he has received in the present instance is also out of the ordinary. Let us examine it, impersonally.

Finding from his experience that he does not receive from visitors the courtesy due to him, Mr. Tait determines not to receive casual visitors. A firm stand upon this resolve seems, in the present instance, to be the head and front of his offending. Of his intention to make no exception to his rule in the case of Dr. Steele, he took pains to write to Dr. Jackson, who wrote introducing him. Here, certainly, was no discourtesy. The only question now involved is, was the act of refusal a discourtesy? So far as popular prejudice is concerned, which need be thrown out of account—so far as Mr. Tait is affected—his popularity among those who are the self-constituted critics of him and his methods, will be still less than it is. So far as the merits of the case are concerned with those who have seen, and are just enough to appreciate his work, they will wonder now more than ever, that he was so tardy in protecting himself from observers, who, whatever diligence they possess, too often have a "zeal, but not according to knowledge."

Says the complainant in the first instance: "Now, sir, I cannot but construe this as an act of discourtesy, * * * an insult to the medical profession of Chicago, * * * and to my colleagues in the 'College of Physicians and Surgeons.'"

In the same number of the *Western Medical Reporter* appears a letter from Dr. Steele, in which he recounts his experiences and impressions of other operators whom he has visited and observed. These are some of the impressions: Of Mr. Treves he says: "He is rather a careless antiseptician." Of Mr. Christopher Heath: "Rather given to profanity if matters do not go to suit him." Still another: "I saw Mr. Knowsley Thornton operate upon a unique case in rather a bungling manner." Yet another: "At my final visit, I saw a most interesting case of hemorrhagic cyst of the pancreas. Stephen McKenzie regarded it as an abdominal lipoma. Treves thought it to be a sarcoma, and I made bold to suggest to him in the ward * * * the strong probability of its being a pancreatic cyst. * * * To my delight, it proved to be, as I predicted, a cyst of the pancreas. At his next clinical lecture, Treves gave a very complete review of the pancreatic cysts, omitting to mention, however, the recent American cases of Bull, Fenger and my own. * * * He was of the impression that a correct diagnosis had never been made prior to the operation. I took occasion to supply the omissions and correct his misapprensions on the subject in a personal letter."

At the risk of being tedious, we have quoted to this extent, simply for the intelligent criticism of our readers. Is it courteous for a visitor, courteously admitted to any operation, or society, by "the unwritten law of medical comity," [Steele to Tait] to go out from that operation, or that society, or interview, to characterize one, as careless in antiseptics; another, as profane; and still another, as a bungler, in any respect whatsoever? Is a part of the unwritten law of medical comity to make a formal pronunciamento that Mr. Treves and Mr. McKenzie failed in the diagnosis of an abdominal growth, while Mr. Steele, of Chicago, correctly diagnosticated it? The modesty of such announcement goes without question. Leaving, for the moment, Mr. Tait's refusal out of sight, it would seem that such criticism as the above would justify any man's exclusion from a future operation, "by the unwritten law of medical comity."

We do not believe it generally felt that an operating room is, or should be, a resort either of a scientific multitude, or of a curious rabble, or of eager critics. On the other hand, a surgeon has the right of every other man to protect both his work and his patients. The limits of that protection he must decide for himself. It is his right pure and simple, without question. No man disappointed in a failure to see an operation, has a right to interpret a polite refusal as a personal insult, or as a general slight to all friends and associates.

The tone of Dr. Steele's letters is unfortunate for his side of the question. When he writes, "Why I Did not See the Birmingham Spayer," he shows, we think, the spirit in which he was ready to criticize Mr. Tait, and justifies a standpoint of still greater exclusiveness on his part, so far as admission into his operating room is concerned. The "unwritten law of medical comity," like mercy, should "bless him that gives and him that takes," and should be always ready to allow to others what it exacts for itself. So far as this controversy will influence Mr. Tait and other surgeons—British or continental—in their opinion, and estimate of America's medical men, it is unfortunate. We trust, however, they will not follow the principle of *ex uno disce omnes*, but rather look on the "comity" side of the question and remember

"'Tis pleasant sure to see one's name in print,
A book's a book, although there's nothing in't."

—*Buffalo Medical and Surgical Journal.*

CASES OF EROSION.

Dr. Faught. There is still another condition I would like to report for discussion. I had a girl of thirteen under my care whose teeth were fully up to the average, only having a few cavities filled. She went away one summer, and when she returned I found that the enamel on the cervical borders of her teeth was completely disintegrated. It was as white and as soft as chalk. I was at a loss to known what the best course was to pursue, but finally took sharp burs and trimmed it all away and polished her teeth and let her go. I do not know whether this treatment proved curative or what was its effect, for she did not return, as I lost the whole family shortly after on account of fees. Now I have a similar case,—a lady of twenty-three. This lady is of a nervous temperament and has suffered very much. The conditions are very similar. I am holding the case under consideration and would like to hear an expression of opinion.

Dr. J. Truman. These are simple cases of erosion, nothing more. The secretions of the mouth are acid and are destroying, or have already destroyed, the enamel. I certainly would not care to use the bur on such teeth, but would prefer less energetic treatment. An alkaline wash connected with general toning up of the system is the course to be pursued. This destruction is carried on mainly at night ; this I demonstrated long ago was the period of greatest destruction. The dryness of the mouth at that time, caused by the general subsidence of the salivary secretion, invites this process of fermentation and an increased quantity of acid products. This I have demonstrated by testing the secretions of the mouth at this period, and the marked acid response has been conclusive of the correctness of this view. At that particular locality the danger of erosion is greatly increased. Dr. Kirk has shown that the glands of the mucous membrane covering the lips secrete at all times an acid; this in the day hours may not be injurious, from the constant dilution by the alkaline saliva; but at night there is nothing to counteract its influence. Between thirteen and twenty is the age when these destructive influences are the greatest and the most rapid in their work.

My plan of treatment is lime-water as a wash, and chalk made into a paste and applied on the teeth at night and allowed to remain there. This has stopped all action when persistently applied.

Dr. Faught. I consider that the condition is indeed a serious one, and want to know if there is anything further to be done. I have placed the patient on the chalk treatment, but want to know about burring away the disintegrated enamel and polishing the dentine.

Dr. J. Truman. I would not do any cutting; polishing with stick and pumice or chalk should be the extent of efforts at removal of softened tissue.

Dr. Kirk. This acid action is called erosion by Dr. Truman because it leaves the surface rough. The reason it leaves the surface rough is because the teeth of children are softer than good teeth in adults; the same acid will cut a soft tooth more quickly, and therefore the surface will be left rough, while acting more slowly on a harder tooth it will be left smooth. The same phenomenon can be shown by exposing glass to the action of fluoric acid; if the acid is strong the glass will be rough, if it is weak the surface will be left smooth.—*Dental Cosmos.*

THE RUSTING OF IRON.

In this short paper there is, so far as I know, no new fact described. I believe everything, or nearly everything, in it to be found in the records of chemical research; but as I find that the process involved in the rusting of iron is often misunderstood, I have thought it worth while to put together the known facts in their connection. My attention was first called to the subject by observing what happens when a drop of rain falls on a clean, bright surface of iron. At first, for a short time, the drop remains clear, and the bright surface of the iron is seen through it; but soon a greenish precipitate forms in the drop, and this rapidly becomes reddish brown. The brown precipitate does not adhere to the iron, but is suspended in the water, and becomes a loosely adherent coating only when the water has evaporated.

I may premise that, in speaking of rusting, I mean the formation of rust on the surface of metallic iron exposed to ordinary atmospheric conditions. I do not intend to treat of the corrosion of iron by substances such as sulphuric or sulphurous acid, hydrochloric acid, or any other occasional impurties which may be present in air.

It has been conclusively shown that the necessary conditions for the production of rust are: (1) metallic iron; (2) liquid water; (3) oxygen; and (4) carbonic acid, both the latter being dissolved in the liquid water.

Iron remains free from rust in an atmosphere containing oxygen, carbonic acid and water vapor, so long as the water vapor does not condense as liquid water on the face of the iron.

Let us consider now the action on iron of the three substances, liquid water, oxygen, carbonic acid, singly, and then two and two.

Liquid water, quite free from dissolved gases, does not act on iron at ordinary temperatures. At high temperatures, very rapidly at a red heat, iron is oxidized by water or water vapor, and is converted into the magnetic oxide of iron. This magnetic oxide is formed on the surface of the iron as an adherent coating, and only when it is detached can the water gain access to lower layers of iron.

Oxygen gas alone does not act at ordinary temperatures on iron. At high temperatures it also converts the iron into the magnetic oxide, which forms an adherent coating.

The same is the case with carbonic acid gas, acting alone. At ordinary temperatures it is without action. At high temperatures the carbonic acid is reduced to carbonic oxide, and the iron is oxidized to magnetic oxide, which forms an adherent coating.

Liquid water with oxygen dissolved in it does not act at ordinary temperatures on iron. This is shown by the fact that ordinary water exposed to the air does not rust iron if the water contains a substance, such as lime, or caustic alkali, capable of combining with acid and itself without action on fron. As long as the lime or caustic alkali is there, no rusting occurs. When the lime or caustic alkali has been converted by the carbonic acid of the air into carbonate, then, and not till then, can the carbonic acid of the air dissolve as such in the water, and then, and not till then, does rusting begin.

Water, containing carbonic acid dissolved in it, acts on iron at ordinary temperatures, forming ferrous carbonate, which dissolves in the carbonic acid water, forming, no doubt, ferrous bicarbonate. In this way artificial chalybeate water has been prepared by shaking up finely divided iron with carbonic acid water. In this action hydrogen gas is given off. Solutions have been thus prepared containing nearly one tenth per cent. of iron. If oxygen is present dissolved in the water, it will unite with the nascent hydrogen ; and if we have sufficient water, iron and carbonic acid, the whole of the dissolved oxygen will thus be consumed. The presence of dissolved oxygen quickens the solution of the iron, the tendency of the oxygen to combine with the nascent hydrogen supplying an additional motive to the action. Probably in ordinary rusting no hydrogen actually becomes free, as under ordinary conditions there will always be enough dissolved oxygen to convert all the nascent hydrogen into water.

When a solution of ferrous bicarbonate is exposed to an atmosphere containing neither free oxygen nor carbonic acid, it loses carbonic acid, and insoluble ferrous carbonate is precipitated. If free oxygen is present in the atmosphere to which it is exposed, the ferrous carbonate is oxidized to ferric hydrates, carbonic acid being given off. This, if the water is not already saturated with carbonic acid, dissolves in the water.

We can now follow the whole process of rusting, and divide it into stages—these stages being really separable, if we take proper precautions, but in the usual case overlapping one another.

We have, 1st, the formation of ferrous bicarbonate into ferric hydrate, the white ferrous carbonate passing through green and black intermediate substances into the reddish-brown ferric hydrate-rust.

We have to note that the carbonic acid dissolved in the liquid water, which is necessary for the process of rusting, is not used up in the process. It is given off during the oxidation of the ferrous bicarbonate to ferric hydrate, and is thus ready to act on the new surface of the metallic iron. The continuation of the process of rusting is not, therefore, dependent on new carbonic acid absorbed from the air, but the original carbonic acid, if not removed, can carry on the process indefinitely, as long as liquid water is present, and oxygen is supplied from the air. Once the process is started it goes on more rapidly, because the porous rust not only does not protect the iron, but favors, by its hygroscopic character, the condensation of water vapor from the air as liquid water. A piece of iron, therefore, which has begun to rust, will continue rusting in an atmosphere not saturated with water vapor, an atmosphere in which a piece of clean iron will not rust, because liquid will condense from such an atmosphere on the hygroscopic rust, but not on the bright iron.—Brown, *Engineering*.

THE WORKING OF CELLULOID.

The chief cause of failures, when moulding celluloid by either steam, oil or dry heat, is owing to the form of the blanks, which could be easily remedied by changing the moulds, which necessitates from a half to an hour's hard work of scraping and filing, with the result then of only a faint approximation of what a blank should be.

That the color of the celluloid blanks could be made to resemble every shade of mucous membrane, no one can doubt who is at all familiar with the innumerable articles of every conceivable shade now on the market.

The tendency of culluloid to warp and discolor can be overcome by moulding it in a plaster investment heated to a temeperature of 315° in a dry chamber.

The moulding at this high degree of heat must be done inside of five minutes, or the celluloid will become porous or burn.

The judgment now necessary to mould a celluloid plate in five minutes, and have the denture come out perfectly finished, all ready to be placed in a patient's mouth, without any filing or polishing, requires mechanical skill of a high order trained by long experience.

It seems to me that the following method will enable any mechanical dentist to make a perfect celluloid denture every time without a failure :

Set the teeth up in paraffine in the usual manner, trim and shape the paraffine to the exact form you wish the celluloid plate to have, run a small bead of paraffine around the pins, dip the case in cold water and remove the teeth with the thumb and finger ; partially fill the cavities left by the teeth with melted paraffine, invest this paraffine pattern on a tin die in plaster, the same as you would if the teeth were in place.

Scrape and file a celluloid blank, especially in the roof, until it is as near the form of the paraffine pattern as possible. Heat the plaster investment, and mould at about 270°. Get the plaster all off the celluloid, even if you have to polish it. You will then have a *perfect blank*, which can be easily moulded into the teeth in five minutes, without danger of crushing the teeth or cracking the investment. This process saves time and teeth, and there is a greater demand for these perfect celluloid plates at $30 each, than for rubber plates at $10 each, by the same class of people.

In the six years that I have made celluloid plates by the dry heat process, I have never seen a broken one. The teeth break the same as on other bases.

To replace a broken tooth : Select a tooth, cover the pins with an excess of paraffine, place it paraffine up in the lower half of a flask filled with plaster ; fill the upper half of the flask with plaster, open the flask and remove the paraffine ; heat the investment and melt a piece of celluloid on the tooth the same as if you were moulding a whole denture.

Enlarge the cavity, left by the broken tooth, on the lingual side. After grinding the teeth and shaping the celluloid until it fits perfectly, cement it in place with collodion. The union of the celluloid will be perfect, and the tooth will be held as firmly in place as any tooth in the plate. The difficulties encountered in trying to overcome these two points have confined the manufacture of celluloid dentures to a very few dentists.—Seabury, *Independent Practitioner*.

LEAD ROOTS ON TEETH FOR IMPLANTING.

Not aware of any attempt to obtain teeth free from danger of communicating syphilitic and other diseases, I have spent considerable time in study and experiments to get a substitute for natural teeth for implantation.

Probably porcelain teeth with roots of porcelain, wood, tin, or silver, would be retained in place if skillfully inserted. But as lead is generally tolerated in the body without trouble, unless impinging on vital parts, it is, no doubt, the best material for roots of teeth for implanting.

The roots of continuous gum teeth reduced in size, with notches like the original, were enveloped in beeswax, invested in plaster and sand, boiled to remove the wax, heated to about three hundred degrees. and moulten lead poured in to fill the spaces. Plain plate teeth were used by putting silver backs on them, on which were placed strong stakes of silver nearly as long as the roots were to be, with notches in them to hold in the lead, which is attached by the same process as for continuous gum roots.

If the lead fails to flow well about the necks of the teeth, or on the silver backs, they can be reinvested in plaster, slightly heated, and the parts needed readily supplied with the metals used, with a soldering iron, to hold teeth on rubber plates.

The roots are to be filed and reduced to the required size, and they, as well as the sockets to receive them, should be perfectly round and of equal diameter in their entire length. The roots may be gauged to the size of the sockets to fit very closely.

A few days after these roots were completed, on examining a stray number of the *Cosmos*, December, 1887, page 801, I learned that Dr. Harris, Grass Valley, California, invented and had implanted a porcelain tooth with a root of lead, and the case was reported to be doing well.—BERRY, *Ohio Journal of Dental Science.*

FALSE TEACHING.

This is dangerous in proportion to the plausibility with which it is set forth, the importance of the truth perverted by it, and the influence and reputation of the teacher.

In spite of the best intentions much of it gets publicly before our profession, both at society meetings and in the journals. We take it that no member of the dental profession intentionally teaches false doctrine; yet in the confusion of debate one may say something *likely* to be misunderstood, and even when he states exact truth, in an accurate manner, he is *liable* to be misunderstood.

On picking up an exchange we find objection to some false teaching charged to our senior editor. And if correctly reported he is half guilty or more.

At a society meeting Dr. Conrad had spoken of some tin and gold fillings having failed, and the report goes on,—" Dr. Watt said that in some cases the action brought about by the combination caused unnecessary sensations or pain in the tooth and sometimes so severe as to cause sleeplessness. He stated that it was not thoroughly understood just what the trouble was, but he was of the opinion that it was thermal electricity."

It was not the intention of Dr. W. to refer to the present mode of using the two metals in filling, for he has had no opportunity to see the results of this practice. He referred to the old method of economizing by filling a large cavity nearly full of tin, and finishing with gold. He has seen trouble result from this repeatedly. If others didn't see it, the *facts* remain. The false teaching went forth, by same misapprehension, and if it can do mischief it will, the same as if it had a valid origin.

In noticing this Prof. Miller, of Berlin, says, "I do not at all agree with, in fact I most emphatically disagree with Dr. Watt's statement. Having used tin and gold in over ten thousand cases, and seen nearly as many more where it had been used by Drs. Abbott, Jenkins, Sachs, and others, I have not in a single case observed any uneasy sensations characteristic of this combination."

An examination of some twenty thousand cases ought to give evidence of probable safety. Nor would we expect the trouble referred to from the two metals intimately mixed, and both coming to the surface.

We cordially thank Dr. Miller for calling attention to the error. He knows that negative testimony cannot set aside positive, but here they are not on the same subject.—*Ohio Journal of Dental Science.*

(*a.*)—THEIR STRUCTURE WAS VASCULAR—(*b.*) SUGAR NOT NECESSARILY THE CAUSE.

The following are from Dr. Shear Jashub Spooner's, "Inaugural Dissertation" on the teeth, part of a popular treatise published in New York in 1838, fifty years ago, or long before most of us took in "the peep o' day." We are indebted to Dr. T. S. Hitchcock, of Owego, for the book.

We apprehend that the following facts will satisfy any man that the bony structure of the teeth is vascular.

In the spasmodic cholera the teeth are said to be frequently injected with the red particles of the blood, particularly by the

French physicians ; our own observations will not permit us to bear testimony in the favor of this assertion, though we do not doubt but that it does happen.

"I have at this time five teeth taken from the jaws of a very plethoric woman, who died of a violent inflammatory fever, which appear completely and beautifully injected with red blood."—*Fitch on the Teeth.*

"I have frequently examined the teeth of persons, whose death had been caused by hanging or drowning, and have invariably found the teeth of a dull deep red, which could not possibly be the case if these structures were devoid of a vascular system."—*Thomas Bell on the Teeth.*

Dr. J. Spooner, of Montreal, has had several opportunities of examining the teeth of persons who have died on the gallows, and has invariably found the phenomena mentioned by Mr. Bell.

We have in our possession several teeth taken from the jaws of a man who was hanged, the whole bony structure of which is red with blood.

Many more arguments and facts might be adduced in proof of the vascular structure of the teeth ; but we trust enough have been advanced to establish it fully. We have even dwelt longer on this subject than may be thought necessary ; it so, a desire to establish our opinion beyond a doubt, is some apology ; for if our views be incorrect our practice must also be incorrect, as to the judicious treatment of the disease of the teeth must depend upon the structure and pathology of these organs.

* * *

It is a general opinion that sugar and all kinds of sweet things are highly productive of decay, and this opinion appears to be founded on the circumstances that they often occasion painful sensations in the teeth, when taken into the mouth.

Sugar cannot act directly on the teeth, for, though it contains the principle of acidity, its affinity for lime bears but a small proportion to that of phosphoric acid, of which the enamel is principally composed. By fermentation, it gives forth the acetous acid ; by distilation with nitric acid, it forms oxalic acid, which has a stronger affinity for lime than other acid whatever. Without one of these combinations, the action of sugar upon the phosophate of lime must be extremely weak, for the mineral acids, the oxalic, tartaric and succinic, are the only known acids, whose affinity for lime, is stronger than that of phosphoric acid. We have kept teeth in sugar and syrup for upwards of four months, and yet they have not undergone any apparent change. The Duke of Beaufort is said to have eaten a pound of sugar every day for forty years, and lived to the age of seventy. After death, his teeth were found to be perfectly sound.

FINISH WHAT YOU BEGIN.

Thousands start well, but never finish one thing at a time. They have a dozen things on hand, and no one completed. Time is wasted on unfinished work. Always finish what you begin. One thing finished is worth a hundred half done. The completion of an undertaking yields more pleasure and more profits than dozens of plans. The man who is always planning and scheming is rarely, if ever successful. He often furnishes ideas for others who go persistently to work and finish what his ideas suggested. "That was my idea—my plan," we frequently hear some one say, but the man who carried it out was the one who benefitted himself and others. Do not begin what you can not finish. What you undertake to do, do, and reap the reward of your own idea and skill.—*Power and Transmission.*

APPEARANCE OF SARCOMATOUS TUMORS.

Sarcomatous growths belong to the group of embryonic connective tissue, and are practically of three types, namely, round cell, spindle shape cell, and giant cell. Every sarcomatous tumor contains each of these types of cells, and the tumor belongs to that variety whose cells predominate; *e. g.*, if the round cells are in excess, it is classified as a round-cell sarcoma; if the spindle-shape cells predominate, it is called spindle-shape-cell, sarcoma, etc.

The malignancy of sarcoma is also the same. The most benign is the tumor in which the round cells predominate; next in this classification comes the spindle-cell sarcoma; and most malignant is the giant-cell growth.

Sarcomata are very rich in cells, very vascular, with but little stroma. Growths of this kind strongly resemble granulation tissue Sarcomata are easily recognized by their vascularity, which depends their characteristic succulence. They are very often the seat of parenchymatous extravasation, these "hemorrhagic infarctus" sometimes giving rise to new productions of pigment matter.

Tumors are not foreign substances introduced into the body, but they all have their prototype in the body. Sarcomata have a roundish, sharply bounded form, and are usually encapsulated, an important point in differentiating between this variety of neoplasia and infiltrated carcinoma. Sarcoma develops frequently after local irritation, especially after injuries.

Cicatrices are frequently the seat of these growths. One variety comes frequently from irritated moles.

Sarcoma grows comparatively rapid, as a rule, but slow, however, under certain circumstances. They are usually solitary, but may be multiple, and very frequently recur after extirpation.

Sarcomata may develop in any of the connective tissues of the body. They are, as a general rule, not painful, unless located in or on nerve trunks.

Sarcomata which develop very rapidly are much more dangerous than those whose development is slow. They very frequently attain large size. If a sarcoma be located in the subcutaneous cellular tissue, it may be felt as an encapsulated, movable tumor. Sarcomata are rarest in children, rare from ten to twenty years of age, most frequent in middle life, and very rare in old age. Men and women are affected with equal frequency.

The treatment of sarcoma is not essentially different from that of other malignant tumors. When the growth has been early and completely extirpated, it gives the patient the best chance for life. The practice of applying escharotic pastes, etc., to malignant tumors, is undoubtedly a very bad thing. No doubt many simple sores and benign tumors have been been converted into true malignant growths by the continued application and irritation of escharotics. Tumors are primarily local diseases, and, when removed early, the treatment proves most satisfactory. If any doubt exists in the surgeon's mind as to the true nature of a tumor, it had best be removed, as it is surely safer to remove a benign tumor than to let a malignant growth run on and finally terminate the life of the individual.

If a lump is observed in which there exists some doubt as to its exact nature, it is a much safer plan to remove it early, even if it proves to be simply a benign growth, than to subject your patient to the hazardous work of a malignant tumor which might be present and the diagnosis shadowed. If it be a benign tumor and you remove it, your pateint is none the worse for it; while, on the contrary, if it proves to be malignant, you have done a vast deal for your patient.—Kern, *Ohio Journal of Dental Science.*

THE USE AND ABUSE OF DENTAL APPLIANCES.

One of the greatest boons of to-day is the rubber dam, and who of to-day has the right to dispense with or declare he will not use it, thus depriving his patients of the benefits of excellent attainment in the operations of filling and treatment of teeth, when in all truth it has been established that it cannot otherwise be secured. Yet the flagrant abuse of this much valued appliance has been such, that many a patient will shudder at the bare suggestion of its adjustment and declare they hold it in perfect abhorrence. And can you wonder, when you think of the bungling manipulations and utter disregard for the feelings or convenience of their patients exhibited by some operators you have seen? Time and time again will they stretch the rubber over teeth, only to have it slip off, crowding finger and hand into the mouth, pushing and jabbing as though the rubber was a contrary, thinking thing, to be controlled only by harsh means and coercion. Then think of the needless cutting into gums with ligatures, or painful pinching of a clamp, to say nothing of the unpleasant suspicion that the identical piece of rubber in hand has possibly served on some other occasion and even now may not be entirely cleansed of the blood of its former victim.

Relieve your patient as far as you can of all this anxiety; be sure you know just what you are about, and let them so understand it. Make all necessary preparations before you attempt to adjust the rubber; select a suitable sized piece, and let it be thoroughly cleansed. If done in the presence of your patient, so much the better. Note the teeth you desire to inclose and their position, and punch the right sized holes for their reception; have your waxed ligatures and properly selected clamps all in readiness, then deftly adjust, avoiding all unnecessary delay and pain While you make everything secure to own satisfaction see that your patient is as comfortable as the circumstances will permit. Look to the saliva, see that it is not excited to an excessive flow, and that it is disposed of without danger of soiling your patient's garments. The awkward handling of an instrument may spring a leak, which is at all times to be avoided. In such a case it is better to at once adjust a fresh piece of rubber than worry your patient in vain attempts to make the leaky one answer. There are cases where you can dispense with the rubber dam. It is simply the means to an end, and when you know the end can be accomplished in an easier and shorter way it is a duty to your patient to do so, providing they are caused to suffer no disadvantage thereby. Your object should be the best results with the least pain in the shortest length of time.

If we can not gain all these requisites just as we desire, but have to make the sacrifice of some for others, try and secure the happy equilibrium, for therein success is found.

The rubber dam has opened up for us possibilities not heretofore obtainable, and we bless the name of Barnum and rejoice in the day when he gave it a free will offering to the dental profession.

Next I will speak of the dental engine, and I assume a special privilege on the subject, as I did lend myself the sacrifice at a clinic before the American Dental Association at its meeting in Nashville in 1870, where Morrison, the inventor, with his first crude instrument, did demonstrate on my teeth what his machine would do, and from that day to this I have been its friend and advocate, and it is to-day an indispensible fixture in almost every dental office in the land. But just to think of the many abuses it has had to endure! I think I voice the experience of nearly every dentist here, when I say that they have scarcely a patient who takes a seat in the dental chair who does not exclaim: "Now doctor, please don't use the machine, as I can stand anything but the machine. I just despise that frightful machine," and we have patients who possibly never saw a machine whose eyes will follow your every movement and dodge at every approach, expecting each instrument you handle to develop into the terrible implement of torture that they have heard such fearful things about.

All this arises from the dentist's abuse and improper use of one of the grandest inventions of the nineteenth century. There is no necessity of making it an implement of torture, and your patients will not think it such if you exercise the necessary care and judgment in handling it.

Excavation of the teeth is not to be exclusively performed with this instrument. The rotating burr and drill cannot without great discomfiture supercede enamel chisel, hatchet, hoe and spoon shapen excavators. With a small hard drill you may develop a cavity and secure a start when the enamel is hard, to be followed by chisel and excavators. With fine burrs or curundum stones you may dress and smooth your margins, and in some instances assist in the forming and shaping of your cavity. You will find your engine very useful in filling teeth with either gold, tinfoil, or amalgam, with the Herbst rotary instruments, not to lose sight of it as a motor for the engine mallet, but the climax of all, to my mind, is its usefulness in finishing and polishing, filling, and in cleansing the teeth, also as a carrier of the indispensible sandpaper disk. With a steady hand and proper pressure you can regulate it just as you please, avoiding unnecessary heating which is always painful, giving such expedition to your work and satisfaction to your patients that they will join with you in sounding its praises.

The matrix is a valuable appliance that has had its ups and downs. We might remark, until quite recently, principally its downs. Although introduced to the profession years ago, there are but the very few who have persisted in its advocacy all through. Even the one whose name has been more closely associated with it than any other, I am informed, almost, if not entirely, abandoned it. But its star is now in its ascendency, and its value so universally recognized that there are but few whose indorsement it does not receive.

And what shall I say of the separators? Since their advent I find no use for corundum disk and heavy file. The treble nought (ooo) file quite answering my purpose, while I never desire one heavier than the "(oo).) I have had experience with the "Perry" and the "Parr," and while I would advise especial caution in those first attempting their use, I would not only indorse and recommend, but earnestly advise every member of the profession to use them, who has brains enough to comprehend the difference between the use and abuse of a dental appliance. You can gain all the space you could hope in other ways to secure, and do it almost instantly. There is no such soreness to the teeth, as in introducing rubber or cotton between them, to remain over night. Nor is there anything like the injury to the gums as by instantaneous wood wedging. The teeth are held in firm position, the pressing so benumbing the parts as actually to diminish the pain in excavating, filling and finishing. In exploring for cavities the separators are of great assistance, for with them, in connection with the rubber dam, you may discover cavities which by the closest scrutiny would otherwise escape detection. In removing a separator after a long-continued operation the pain may be quite as acute, or even more so, than in its first adjustment. This you can avoid by proper care and gentle manipulation. Bathing the gums in aconite or some other antiplogistic will soon restore the normal condition, and you patient will suffer no special inconvenience.—Freeman, *Dental Headlight.*

SOCIETIES AND SOCIETY WORK.

At the meeting of the Ohio State Dental Society, a committee was appointed to investigate the advisability of organizing district societies throughout the state, and taking such steps as are necessary to complete such organization.

This plan has already been adopted by several states, these being divided as best suited for the work. For instance, New York state was divided into districts corresponding to the congressional* districts of that state, while Illinois was divided into five districts, a northern, eastern, western, southern, and central. Reports show that such organizations are proving beneficial, not only as leaders to the state societies, but by stimulating a desire for societies and society work among dentists who otherwise would make no effort to obtain such advantages. Many dentists do not realize the true advantages of society work, perhaps have never attended a meeting for such reasons as being so far away, costing so much to go, and losing so much time in attending, etc. This class of dentists need a stimulant ; societies nearer home, expenses light, meetings interesting, a cordial welcome, character of meeting more like that of a social talk.

The district societies furnish this opportunity and they should be organized in every state, and in such numbers as to cover the entire territory.

Local societies are of advantage wherever practicable, provided the work is entered into with enthusiasm and earnestness.

Consider the number of local, county, and district societies the medical fraternity have. If such gatherings were not valuable would there be so many of them? Dentists have been too slack in this kind of work and slow to recognize the advantages of such organizations.

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* Judcial, (not congressional) of which there are eight. Readjustment is much needed and often talked of, but involves so much labor on the part of working members of the profession and risk at the hands of law-makers, that no change is likely to occur in the near future. When a change is made there, districting will be determined by the railways of the state and centers of business and population.

There having been so few dental societies is no doubt one great reason why so many students on leaving college settle down and depend upon their stored knowledge to carry them through with the work year after year, apparently ignoring the fact that new ideas are being advanced and new methods, appliances, etc., constantly brought out.

We need something to draw these dentists out of this slough and to keep others from falling into it. If a society be organized in their section, they may become interested and greatly benefited and in turn a benefit to the profession.

It is true that many (but by no means all) take some journal, or journals; but though the society discussions are taken verbatim they have lost the impressiveness their author gave them. Besides, many thoughts are given that do not reach the journals, and methods, appliances, and ideas presented "between the acts" that are too valuable to lose.

Go to society meetings for the good of the cause; to acquire all you can and to give to the profession what new things you have learned yourself.

The sooner dentists in general realize the necessity and advantages of societies and society work, the sooner will the profession reach that point of enlightment and free interchange of thoughts and ideas that is required for its true advancement.—*Ohio Journal of Dental Science.*

A DEFECT IN MODERN SURGERY.

The paper by Dr. David W. Cheever, of Boston, on "Shock," of which we gave an abstract in our report of the Congress of American Physicians and Surgeons, brings up a point which deserves much more than casual attention.

Dr. Cheever shows that moderd operative methods, though so much superior to the old ones in most respects, yet tend to cause secondary shock. As he puts it:

"Anæsthetics annul pain, but end in nausea.

"Operations under anæsthetics are needlessly prolonged and exhausting.

"Modern dressings are tedious and chilling.

"Pain and bleeding are *less*. Slow cutting, nausea, exposure, low temperature are *more*. Primary shock is diminished ; secondary shock is increased."

Patients are now frequently from one and a half to two hours on the operating-table, and three hours more in recovering consciousness. Operations of secondary magnitude are sometimes made so long that the patient dies from shock.

Patients are not given food before an operation to prevent nausea, and they often cannot retain food after an operation for a long time on account of nausea. Here, then, is another defect in modern surgical practice. Lowering of temperature is another thing which occurs after operations. The thermometer frequently falls to 96° or 97° F., and may reach as low as 95° F.

The modern surgical toilet of wounds is depressing, exhausting, devitalizing.

Finally, nausea and vomiting are still present in modern surgery, and are often dangerous indications of depressed vitality.

It is very evident that modern surgery is not yet a perfect art, and Dr. Cheever's paper call attention to the fact that all is by no means done when perfect asepsis is secured, or wound infection prevented.

The practical directions given for the purposes of lessening the element of shock are these :

1. Wait for reaction.

2. Never neglect to calm those suffering mental shock by a cheerful word and personal presence.

3. Give alcohol, either spirit or wine, a quarter of an hour before the anæsthetic.

4. Make the anæsthesia short ; never begin it until everything is ready ; suspend it during the last painful dressings. Consciousness returns *tardily*. We keep up the anæsthetic longer than is necessary.

5. As rapid an operation as can prudently be done.

6. As short a dressing as is practicable.

7. As a cardinal point, avoid *chilling* the patient.

To promote reaction after the operation :

1. Persistent and *carefully* applied *dry* heat. (Be *over-careful* about accidental burns.)

2. Liquid nourishment, combined with a stimulant and a little laudanum, by enema.

3. Subcutaneous injection of brandy.

4. Aromatic spirits of ammonia by the mouth. Champagne is sometimes retained when other things are rejected.

5. Black coffee and brandy, the stimulant *par excellence*, when it can be retained on the stomach.

6. Quiet ; a horizontal, or more than horizontal, position ; sleep ; assurance that all is over and doing well.—*Medical Record.*

HUMAN BEASTS OF BURDEN.

At the last meeting of the Anthropological Society of Washington, Professor Mason read a paper in which he described some of the more common ways in which man has made himself a beast of burden. The brief abstract given here presents some of the more salient parts of the paper.

In his prefatory remarks, Professor Mason explained that this was a subject that had awakened his deepest interest, and that the paper he presented was but an introduction to other researches by means of which he proposed to fully investigate and demonstrate the growth of commerce as carried on through the agency of the human body. That the aboriginal inhabitants performed great feats in the way of transporting materials is shown by the co-existence of raw copper on the shores of Lake Superior, and manufactured copper implements in the remains of the mound and cave dwellings in the southern part of the country. The same thing is true of the presence of wrought jade, which is found in China and the Swiss lake-dwellings. Men and women were the first beasts of burden, and it is undoubtedly true that all aboriginal carrying was done on their heads and backs.

Even the improved state of civilized society has not extinguished all traces of this, for human carriers are still numerous. Hod-carriers have but recently, and indeed but partially, been superceded by elevating machines. The great progress of the time has been such, continued Professor Mason, that no one walks nowadays unless it is a preferred excercise: horses, steam and electricity lend their aid to whirl people to their destinations. It is considered vulgar to carry a parcel: the humblest servant-girl, buying a few cents' worth, may have her purchase taken home in a special delivery wagon covered with forty coats of lacquer. It has been calculated that two million tons are constantly worn by the human race in the way of dress and ornament.

The paper then enumerated the various methods by which the various beasts of burden perform their carrying tasks; first of all, the hand,—the right hand. In speaking of this, Professor Mason said that he had examined a great number of savage implements designed to be carried in the hand, and that the proportion of those shaped for use by the left hand was not greater than 1 to 50. In no case did he find a left-hand female implement. Then both hands are used, after which the fingers come into play. As an illustration of the use of the fingers in carrying, Professor Mason mentioned the summer resort waiter, who bears his tray aloft on three fingers. The baldric is next in order, slung over the shoulder by a strap, and hanging on the hip. In this way hunters carry game, and travellers carry small satchels. Then, still progressing, goods to be carried are hung to a belt. Hanging things on the arm may be called the retail method of carrying, and is used by farm hands, servants, porters; in fact by a large proportion of the people we meet in any place. While a civilized being will twist his form so as to get the load that is hung on his arm supported by his back, a savage will never be found doing so. Next comes the hanging over the shoulder, of which a good example is the universal sack of the negro vagabond, containing unclaimed property and other people's chickens. This method is used by grain porters and hod-carriers.

The Oriental porters carry almost exclusively on the shoulders. A cooly's average load is a hundred pounds, with which he can make thirty miles a day. It is estimated that there are a million tons of material moved by coolies in China each day. Then both shoulders come into use, the load being placed round the neck; after which an easy progression is to the back, which is the natural carrying place of the burden. The soldier, carrying his knapsack and rations, is a good example. Then loads are carried on the heads,—a process called 'toting.' The negro is a domestic example, and dairy maids are reputed to carry their milk pails on their heads, and there are many other illustrations of this mode of transportation. Certain tribes of Indians wear straw rings on their heads to aid in bearing and balancing these great loads. Pockets, remarked Professor Mason, are scarcely worth mentioning as a civilized means of transportation, although the flowing robes of a Chinaman are capable of concealing at least half a bushel of playing caeds,—a capacity that deserves passing notice.

The carrying power given by these various modes is augmented by means of combinations of men, in illustration of which the' vast works in Egypt and other Eastern countries were cited. Men also carry goods by traction; that is, by drawing over the ground. First the arm alone is used, then a line is fastened to the object and to the person. It is held in the hand over the shoulder, or wound over the waist or over a pole. The hunter drawing home his game is a primitive example of this means of carrying. Throwing is sometimes resorted to as a mode of transportion, of which the negro method of handling watermelons by tossing them from hand to hand is a fair example. Dirt and excavated material were at first carried in sacks, which have been superceded by shovels. The great necessities and the differentiating processes of civilization for rapid and safe transportation give rise to the professional carriers, among whom may be mentioned carriers, messengers, mail men and pedlers.—*Science.*

PATHOGENIC BACTERIA IN HUMAN SALIVA.

Every day, dentists are being called to extend the boundaries of their range of knowledge. The surgical affections of the mouth, tongue, lips and gums very frequently are referred in the first instance to the dentist, and if he recognizes the significance of the symptoms and appearances and their importance is appreciated, the sufferer is hailed in good time to the surgeon. So is it with the "medicine" of the alimentary tract, or, more probably speaking, of the pharyngeal tract. The dentist of to-day has to be a little bit of a physician' just as he is compelled to pose as a surgeon, and give opinion about surgical and medical ailments which attack his province—the mouth. Without going so far as to say with some writers that "the mouth is the opening into the stomach," we certainly feel that the dentist should possess enough knowledge of the physiology and pathology of alimentation to recognize the aberrations in that function which arise from imperfect mouth digestion. The innervation of the muscular and glandular structures of the mouth, the pervertion in quality and quantity of the saliva, and the imperfect mastication and trituration of food materials introduced into the buccal cavity, are matters with which dentists should be familiar. But there is yet another and most important branch of "dental medicine," which has latterly thrust itself into most prominent notice, the study of the bacteria and micro-organisms infesting the nooks and crannies of the mouth. Since bacteriology became promoted into a science, the immense importance of its teaching as regards health, hygiene, and disease, has been fully recognized ; but for a long time, even before the general mass of the profession were alive to this, many earnest workers had shown the powers for harm-doing micro-organisms possessed when they were domiciled in the mouth. As has been well pointed out, that cavity, in many particulars, offers an admirable substitute for a "cultivation chamber." The heat, moisture, and constant presence of albuminous and sugary debris, present all that certain forms of micro-organisms need to grow and multiply indefinitely. It is a common impression that the mouth of healthy persons, or rather of those who are believed to be free from recognized disease, can not harbor pathogenic bacteria, although recent researches have abundantly proved the existence of micro-organisms in different forms of dental disease. However, Netter, a careful and reliable observer, has revealed a somewhat startling state of things. He examined the saliva of numerous ostensibly healthy persons and found that a bacillus existed in every case which closely resembled, if it were not identical with, the *Streptococcus pyogenes* described by Rosenbach, a micro-organism associated with, if not the cause of suppurative inflammation. For dentists, this fact possesses the greatest interest, for while these bacilli are present in a mouth, the most extensive suppurative processes are upon the verge of being initiated. While upon the one hand fair vitality, or as doctors prefer to call it, "resistive power to disease," is present, and the buccal epithelium is intact, the streptococcus pyogenee is unable to do damage ; yet, on the other hand, we have but to find a patient worn out by town dwelling, prolonged pain, or tendency to infective forms of disease, and we may be pretty sure that should an abrasion occur in the mucous membrane of the mouth the streptococcus pyogenes will effect an entrance while suppuration will certainly ensue. When it is remembered that very many dental operations must not only lay open the lymph channels of the soft tissues, which, of course, are the absorbing media, but open up bone cavities, Netter's results assume even greater importance than might at first appear. There can be little doubt that many of the reported cases of pyæmia, following extraction of teeth, are cases in point, while it seems likely that the explanation why so few casualities of this sort occur, lies in the well known free blood supply of the buccal cavity and its contained structures, together with the "free drainage and irrigation," which usually obtain in superficial wounds of the gums and jaws. Swelled faces, colds "caught" in the socket after extraction, may, in many cases, also come under this category, and may well provoke closer study and more efficient prophylactic treatment. Netter's discovery points certain lessons. In the first place, free use of antiseptic mouth wash, boric acid solution, boroglyceride, carbolic acid, permanganate of potash, listerine, chloride of zinc in dilute solution, with mercuric salts, should be had resort to, both before and after extraction; while a most careful cleansing of all instruments should be insisted upon, in order to avoid the ever present danger of transferring from one mouth and inoculating into another the streptococcus pyogenes, and other pathogenic bacteria. Forewarned is forearmed, and so we will hope that in this case the old saw will be found accurate.—*British Journal of Dental Science.*

WHAT DO YOU KNOW ABOUT AMALGAM.

Dr. A. H. Fuller then read an interesting paper on "What do we Know about Amalgam," the discussion of which was opened by Dr. Patterson, who said that this subject was apt to cause much discussion. He did not agree with all the conclusions of the writer. In regard to the injurious effects. He does not believe there can be any injurious effect after the filling is hardened and oxides are formed. As he inserts an amalgam filling, there is no change, no shrinkage, no expansion. All cavities that are to be filled with amalgam should be made simple cavities, with three or four walls, using matrix if necessary. He uses a mallet, or other force, with a pad of cotton or spunk under point of instrument, and inserts it as rapidly as possible to make a solid filling. If the cavity is properly prepared, there is no thin edge to break off.

In regard to amalgams in general, he objects to the color in the mouth in any position, and only uses it on account of the pecuniary consideration. Some dentists assert that they will not use it, or anything but the very best material—that is gold; but in the country, and where it is necessary to earn a living, it is necessary to use this material, though he constantly uses the cement more and amalgam less for this class of work.

He has had no particular experience with copper amalgam, but objects to it more than the others on account of the color. Can not see how copper amalgam could have any poisonous effect, as it oxidizes, and the oxide is inert since there can not be sufficiet acetic acid in the mouth to act on the same.

Dr. Stevens is obliged to use amalgam often in his practice. In building up a tooth with this material, he sometimes makes a band of gold, which is fitted perfectly to the root and then filled with amalgam.

Dr. Patterson asks that statements, in regard to cases where amalgam is supposed to be injurious, be substantiated, as we have no positive proof that the trouble ascribed by many to the mercury in fillings, is due to it.

Dr. Pierce is thankful to Dr. Fuller for his paper, as it permits him to bring out one or two points on the subject of which he has made a study. He doubts that there is any injurious effect from amalgam fillings after hardening, as he has made the test repeatedly with gold foil and found no traces of the fumes of mercury. Before the filling is hardened, there are fumes that affect gold foil, but when once crystalized, it will not affect it. As to the poisonous effects of the copper, if mercury and copper form no chemical compound, and if the copper is only held by suspension, there will be copper salts formed by the acidulated moisture in the mouth, and these salts are poisonous. Put a copper plate in acidulated water and it will be oxidized, but the copper salts continue to be deposited. But, if mercury and copper do make a chemical compound, then it is possible this compound may be of a different character from either mercury or copper. He has experimented with all amalgams and finds copper salts in every amalgam containing copper. He disagrees with Dr. Fuller when he says that the dryer the amalgam the more shrinkage there will be, as he has found that the dryer the amalgam, as long as it can be handled, the better. As to the toxical effects of copper salts, he is an advocate of the idea that the finer you divide, the more effect there is, as he proves in the use of mercury, of which a teaspoonful may be taken without producing any effect, but if there is sufficient warmth of body to produce vapor from it, there will be a poisonous effect.

Dr. Conrad has never seen a single case where there were any bad constitutional effects from amalgam fillings. If there is a liberation of free copper for formation of copper salts in the mouth, there would, in time, be an appreciable loss of substance, which is not found to be the fact. The use of amalgam is dangerous, because the copper amalgam makes such a perfect filling that we are liable to put in too many; that old copper amalgams look like gold. Copper amalgam will not discolor tooth substance, makes a perfect edge, and that, in the case of children with soft teeth, makes the best filling.

Dr. Patterson said that it has not been shown yet that there are poisonous effects from copper amalgam *in the mouth*, but only that there are such effects out of the mouth, which no one denies. Nitric acid will destroy a tooth out of the month, but, though nitric acid exists in the mouth, we know it does not destroy the tooth in the mouth. Nitro-muriatic acid will dissolve gold, but, though it exists in the mouth, we know it does not dissolve the gold filling in the mouth; and it is not proved yet that there is any poisonous effect from the copper salts in the mouth.

Dr. Pierce said it is difficult to prove any fact or effect in the mouth, and it is impossible to get positive evidence in the mind of a doubting Thomas. If you touch an amalgam filling in the mouth with acetic acid, it causes an immediate flow of saliva from Wharton's duct; and that while this might be something else, he believes it to be the irritation caused by the poison salts.

Dr. Patterson said the action of acetic acid on the gustatory nerves alone, would cause the flow of saliva.

Dr. Conrad said that as to amalgam fillings which were as green as grass, he had seen a tooth filled with gold which was almost as green as yellow grass, but did not know what caused it.

Dr. Harper said that in regard to discoloration of copper amalgam, he had found that in some mouths it does not discolor at all, in others, slightly, and in others was very dark. In regard to green color, he had transplated a tooth, filled the root with gutta-percha, and the tooth turned green.

Dr. McMillen told of a tooth crowned which turned green.

Dr. Morrison recommended the use of the French bibulous paper to use in packing amalgam.

Dr. Fuller said that Tomes gives careful evidence that he has not seen evil effects from amalgam fillings—and many others also—but there are many who have given evidence to the contrary, and we should accept this in preference to the other. Because one man has not seen a thing, does not prove that it does not exist. Some constitutions are possessed of certain idiosyncrasies, and certain articles that are harmless to the majority of people, act as poision to them, as, for instance, strawberries, and again, honey, and others; and some people have this idosyncrasy that their systems will not admit of the presence of even the smallest amout of mercury. He then gave two cases where there was every evidence of poisoning from the mercury in an amalgam filling; one where it was used for setting a crown, and the other as a filling in the mouth of a boy, and concluded that, "there being evidence in favor of it, the evidence to the contrary should not be accepted in preference."

Dr. Patterson said that Dr. Fuller has just given the first authentic case of injury, due to mercury in amalgam, that he has ever heard; but even this being the case, to what point does the discussion tend? Are we to do without amalgam because there are a few cases of injury from its use? Every physician will tell you that he meets with idosyncrasies in people, some who can not endure morphine or quinine, etc., but they do not, on that account, discontinue the use of these valuable remedies.

Dr. Fuller wished to correct any such impression, and moved the subject be passed.—*Archives of Dentistry.*

THE BEST ANÆSTHETIC.

There is undoubtedly at present a tendency, perhaps due to German influence, to return to chloroform as an anæsthetic. Mr. George Foy, in defending chloroform anæsthesia in the *Lancet*, quotes the following statistics: "At the Edinburgh Infirmary, during a period of twenty-eight years from the introduction of chloroform into the surgical practice, only two deaths had been attributed to chloroform, which, according to Kerr, is one death in 36,500 administrations. Elser, of Strasburg, had used chloroform 16,000 times, and had never seen a fatal case; Kidd, of London, 10,000 times, without a death; Dr. Bardelebin, of Berlin, 30,000 times before meeting with a death; French surgeons in the Crimea, 30,000 cases, and not one fatal issue; English surgeons in the Crimea, 12,000 times, with one single death reported attributed to it; McGuire, of Jackson's Corps, 28,000 times, and no death; Richardson had seen it used in the London hospitals 15,000 times before he met with the first fatal case; Billroth, of Vienna, 12,500 times before he met with his first accident."

In the Federal army it was administered in 80,000 cases. In thirty-seven cases fatal results have been ascribed to its use. To this the *Lancet* replies: "Those who are familiar with American methods of ether-giving will naturally repudiate any conclusions based upon the experience of American surgeons, since the routine drenching with ether in vogue in the United States has no counterpart among skilled anæsthetists here. Sequelea such as those described by Dr. McGuire are practically unknown in England. Dr. Chisholm may not have lost any patients from chloroform, but he has published accounts of several cases in which he confesses he thought death was imminent. The statistics quoted by Mr. Foy, and borrowed from Drs. McGuire and Chisholm, are really out of date, and unhappily give too low a percentage of deaths. Even accepting them, they show a far higher death rate than can be obtained from ether." That routine drenching with ether is the practice among American surgeons we must emphatically deny. For the rest, we leave the argument to our readers.—*Medical Record.*

FOOD-CRANKS.

The vegetarians are at it again, trying to persuade people to give up eating meat. Of all cranks on earth food cranks are the wretchedest. They pass their miserable lives in an insane effort to find out what agrees with them. As a rule nothing does. They remind one of the horse that was fed on sawdust—just when he learned to eat it he died. They are afraid to eat a wholesome meal. Morbid dread of swallowing some impurity takes away all pleasure of living. Dyspepsia like a starving vulture sits upon their congested maws and pecks at their vitals. The sorriest specimens of humanity I have seen are those that patronize so-called health-food stores. How they survive is a mystery.—*N. Y. Tribune.*

IMPLANTATION OF METALLIC CAPSULES.

At a recent meeting of the Student's Society of the New York College of Dentistry, Dr. J. W. Edwards read a paper on the above subject, of which the following is an absrract :

In March, 1886, the idea first occurred to me of implanting metallic roots. Since that date I have carefully considered the possibilities and probabilities of such an operation. After examining many specimens of encysted metallic bodies, such as silver ligatures and lead bullets, I concluded that lead would be the most suitable of metals to become encysted. First, because of its peculiar antiseptic properties; secondly, it is softer and more pliable than any other metal, and, therefore, more easily adapted to the walls of the alveolus; thirdly, after oxidation inflammation begins to subside.

Concluding that the operation would be successful, I determined to operate at the first opportunity. A favorable case presented itself October 21st. The patient, a young lady of twenty, had the root of a first right superior bicuspid extracted, and replaced by a metallic capsule.

My method is as follows: Where the natural roots are extracted, a platinum capsule is made to correspond. The capsule is first dipped in hydro-chloric acid, then in melted lead, and then serrated with a wheel burr. Before inserting, thoroughly syringe the socket with a five per cent. solution of carbolic acid, or, if there has been an abcess, a solution of bichloride of mercury. The socket is then cocainized with saturated cotton.

The capsule is now inserted and burnished perfectly to the walls of the alveolus. The patient should be seen daily until all inflammation has subsided. Should any undue inflammation occur, local treatment should be carefully followed out. I consider the local application of ice most efficient. After the capsule is firmly encysted, the crown may be inserted—time, three or four weeks; allowing this time for rest before inserting the crown, is carrying out one of the first principles of surgery.

Implanting metallic capsules where teeth had been previously extracted, I first inject cocaine. I then use spiral knives, Nos. 1 and 2, devised by Drs. Walker and Tounger, and reamers Nos. 2 and 3. Trephines Nos. 4 and 5; also tubuler knife No. 3.

After the socket has been formed and thoroughly syringed, as before directed, an impression of the socket is taken with modeling composition. A piece of soft wood is made small at one end, forming a shoulder about one-half an inch from the end. The small end must be smaller than the socket which is to enter. The modeling composition is made soft and placed around the small end of the wood, and pressed into the socket. In this manner an accurate impression of the socket may be obtained.

This impression serves as a model, and is moulded in sand in the usual manner.

A zinc cast is then made, the platinum foil is made to fit this cast and soldered with silver, dipped in hydrochloric acid and then in melted lead, following the directions previously given.

I believe any number of metallic capsules may be thus inplanted, without injury, as the basis for a full upper or lower denture, or both. My idea is to implant four metallic capsules, two in the posterior part of the arch—one on either side—two in the anterior about the location of the canine teeth. The denture must be constructed as follows: A rim of gold twenty-two karets fine, twenty-eight standard guage in thickness, may be swaged to fit the gum, and four abutments soldered to it to correspond with the implanted capsules, and to telescope in the same. Counter sunk teeth may be attached to the gold rim with a pink rubber, or the rim may be made entirely of platinum, and continuous gum teeth may be attached.

CHEMISTRY, PHYSIOLOGY AND PATHOLOGY OF NITROUS OXIDE—PRACTICAL POINTS.

GASEOUS INTERCHANGE.

And, first, as to the effects produced by the inhalation upon the gases contained in the lungs and blood, and for which I have used the term "gaseous interchange."

1. That the expired gas tends to become precisely similar in composition to that inspired, so that, *prima facie*, one would be justified in concluding that no very active decomposition of the gas occurs; and this conclusion is further justified by the researches of Hermann and other observers.

3. That the carbonic acid, instead of being increased in quantity, as is the case in aerial expirations, is rapidly and continuously diminished.

3. That the amount of oxygen is diminished and, in fact, almost entirely disappears.

4. That, as might be expected from the fact, the nitrogen does not take any very active part in the physiological functions, even under ordinary circumstances, in gaseous inhalation, it is removed by diffusion alone, and hence very slowly.

5. That the substitution of nitrous oxide for the other gases does not take place at all equally or proportionately, but mainly at the expense of the oxygen, which is rapidly reduced.

Dr. Amory's experiments upon himself and upon dogs, have very much the same result, but were carried somewhat further. He found that the relative amount of carbonic acid inhaled during fifty respirations of the gas, was only about half of that found in the same number of ærial respirations.

CONCLUSIONS.

1. That the progressive loss of carbonic acid in the expired gas is not associated with any accumulation in the blood, and must, therefore, be due either to lessened production in the tissues or to defective absorption by the blood.

2. Now, in order that carbonic acid may be produced, free oxygen, or an agent capable of yielding free oxygen, must be present. But we see that the free oxygen is displaced by nitrous oxide, and we know that the latter undergoes no decomposition in the blood.

3. Hence, during inhalation, the process of tissue metabolism and the production of free carbonic acid is in abeyance.

PULSE TRACINGS.

A comparison of the pulse trace taken from an average healthy individual during the height of anæsthesia, with one taken from the same individual immediately prior to inhalation, shows:

1. An actual increase in the number of heart beats.
2. The greater height of the stroke.
3. The greater sharpness of the initial curve and apices.
4. The almost complete absence of the tidal wave.
5. The accentuation of the dicrotic wave, which is at the same time removed further from the apex of the trace.

I think we may gather from the consideration of these tracings alone, (1) that the heart's action is accelerated and slightly increased in force; (2) that the blood-pressure is lowered; and this latter point has been proved by actual experiments.

CAUSES OF DEATH.

1. That when death has occurred it has been due either to syncope or asphyxia.

2. Simple faintness may occur either before the inhalation is complete, apparently from fright, or during the stage of recovery, apparently from the shock of the operation.

3. Fatal syncope has, with very few exceptions, been distinctly traceable to the shock, consequent upon commencing or continuing

the operation when the anæsthesia was incomplete, and have, as may readily be imagined, occurred in patients more or less out of health.

4. Hence the importance of never permitting any operation in a semi-anæsthetical condition.

5. The occurrence of asphyxia from laryngeal spasm, or from falling together of the epiglottidean folds, as in chloroform, has not been recorded with regard to nitrous oxide, and does not seem likely to give rise to any trouble. Such a condition, if it does occur, is, of course, to be looked for during the height of anæsthesia.

6. Fatal asphyxia has invariably been the result of some mechanical cause, *e. g.*, regurgitation of vomited matter, slipping of tooth or gag into the larynx, and has therefore usually occurred during or immediately after the completion of the operation.

7. Hence the importance of watching the mouth, as well as the face, during the stage of recovery.

SYNCOPE.

Recognised by—Sudden dilatation of pupil, extreme pallor, heart failure, muscular relaxation, feebleness of breathing.

Treatment.—Prone position, draw out the tongue; artificial respiration.

ASPHYXIA.

Recognised by—Increasing duskiness, violent efforts at respiration, gradual failure of pulse.

Treatment.—Remove foreign bodies (inversion), or draw the tongue *well* forward, press on the chest, wipe out mucous: laryngotomy followed by artificial respiration.—SILK, *Dental Record.*

VACUUM CAVITIES—A NEW IDEA.

Borrowing an item from the said cohesion forms [Dr. Spyer's], I hit upon a device which I beg leave to describe. Some members present may think it worth trying: I take it for granted that every one, nowadays, examines the mucous membrane with the finger and mouth-mirror, noting the various hard and soft surfaces, scraping the impression where the hard points come, and the model where the soft parts are located, leaving, however, a narrow band untouched where the heel of the plate will come Having given great care and attention to these points, I take some of the smallest sized, round-headed gimp nails (a larger size will not answer), and as soon as the model is separated from the impression, and before the plaster becomes thoroughly hard, I press a number of these little nails into the model, covering as much of the palatal surface as I choose. A few marks with a lead pencil enable me to place them regularly. They are tapped down closely, and the case is carried forward in the usual manner. Before putting the rubber into the flask, a coat or two of liquid silex, diluted, should be carried over the model with its little projecting nail heads. There is no further work or trouble about it, and no more time is taken up than is required by the adjustment of a vacuum form. A good, strong adhesion is the result, and no unpleasant results follow.—*Southern Dental Journal*

CARE OF DECIDUOUS TEETH—HISTORY OF DENTISTRY—FEES.

[DOINGS OF THE ROCHESTER DENTAL SOCIETY.]

The October meeting of the Society was held at the office of Dr. B. G. Saunders, who propounded a series of questions on the care of deciduous teeth. The list, with those it suggested to others, included the following :

Would you extract or fill ?

What effect has extraction on the permanent teeth ? On the first molar in particular ?

What would you fill with ?

Would you fill approximating cavities separately, or would you bridge the space ?

Would you fill the roots of deciduous teeth ?

Would you fill cavity of decay in a pulpless tooth without fistula ?

What do you think of the practice of merely perforating the pulp cavity where the cavity of decay is large and there is no fistula ?

These, and a dozen others of similar import, brought to the surface the prominent features of each one's practice, and the similarity of opinion and practice proved a most agreeable surprise.

The November meeting was held at the office of Dr. W. F. Arnold who entertained the Society with the following paper :

History is ever repeating itself in different forms. Since the human race has reached in its evolutinary development up to the eruption of teeth, some kind of dentistry has been needed.

Dentistry is named from the Latin word dens, a tooth. There are shells and plants named dental from having points in structure like the tooth.

Dental Surgery, so far as we have been able to learn up to the present century, was a very crude performance.

And the theory of dental caries equally crude and amusing. The care of the teeth was but little known and what literature we had on the subject was very entertaining from its embryotic condition.

Ambrose Pare said in his treatise on Surgery that a man should so carry himself that he did not in pulling teeth pluck out two teeth for one.

While Prof. Darby was traveling in the East he had a Bedowin Sheik walk fourteen miles to have a tooth extracted by him. He sat on a keg outside of the professor's tent and had the operation performed, and really seemed to enjoy it. The custom in that country among the tribes is to have the muleteer perform that branch of surgery, in which they become quite skillful. They take a mallet and a chisel. The patient opens his mouth and the dragoman puts his punch or chisel down close to the gum and drives out the tooth with a smart blow of the mallet.

In China tooth pullers are trained from early youth to do it with their thumb and first finger. They are taught to pull nails out of boards and by this continued practice get great strength of muscle, and perform this surgical operation very dextrously. Much of their medical and surgical knowledge is not up to this standard. Persons suffering with pains in their head or face will go to one of the native doctors, who, for the most part, are sorcerers or magicians, who interpret dreams, tell fortunes and find stolen goods. He will tell his patient that there are worms in his brain or head, and that they must have a chance to crawl out, so that he will have to make a hole in the head, either through the ear or eye, and whichever organ the person so applying for relief chooses is punctured usually without any relief, so that in China many are deaf and blind.

In 1541 a little book was published with XIII. chapters, on the care of the teeth. One statement is, that few have, instead of teeth, a whole bone to chew with. It states that in old age people lose their teeth and new ones grow. It give an account of Zankelin, who got some teeth at the age of one hundred and four years. And it further says, his brother never lost his and did use them up completely. I will state, that I, several days ago, removed the roots of a whole set of teeth from the mouth of an old lady who had used her's up so completely that not a crown was left on any root. I should judge she had never had a tooth pulled, but let one after another decay down to the gum, till it was necessary to remove them on account of their ragged edges irritating the gum and causing inflamation. The authority I have just spoken of says that vomiting injures the teeth. Also hot victuals burn the teeth and can not be taken without hurt; also, never go to sleep after a meal for this damages the teeth. In speaking of teething, the author says children's gums should be bathed and rubbed with chicken, goose, or duck fat, or the brains of a hare may be taken and rubbed over the gums, mixed with the fat spoken of, and after this wash the head and face, also the neck with tea made from melilot, mallows, chamomile, cubebs. When the teeth break through a little wool from under the neck of a sheep nicely dipped in cubeb oil or chamomile laid warm on the gums and jaw. He also teaches when the first teeth drop out the new ones should be pressed into the place of the old till it sets there among the others.

On Odontalgia. The same author says: "No one knows what toothache is better than he who has had it. Cure is to bleed and cup and to open veins such as the cephalic or those under the lips and tongue, or purging; or take the skin of a snake, boil it in vinegar and hold it in the mouth, that is very good. There are many other things equally good as those named which your time and patience will not permit, as I must hasten on to the main points in the history of our profession."

Heroditus first mentions dentistry (500 B. C.). The Egyptians were the most advanced. Teeth filled with gold have been found in the mumy pits. A collection in Liverpool contains specimens of artificial teeth, and two teeth of Sycamore wood set in gold. It is thought by some that it is only a kind of decorative gilding done in honor of the dead.

Celsus lived about (100 B. C.) and first recommended the use of the file for removing decay and sharp projections on the teeth. After this writer little is said about the teeth until the fifteenth century, and from that on to the present time. The latter part of the eighteenth century the anatomy and physiology of the teeth was very nearly as well known as it is now.

In 1774 and 1776 mineral teeth were first introduced into France. Previously to this elephant and hoppopotamus ivory, and animal and extracted human teeth were used. The base as well as the teeth were carved from ivory. Wooden bases were sometimes used. The workmanship on these dentures were crude and the plate ill-fitting. So that Washington could justly say of his teeth that they were an infirmity. These dentures were held in place with spiral springs.

Tooth extraction was the principal part of dentistry and was performed by the family doctor or barber. The turnkey was the principal instrument used and the doctor, with a red bandana handkerchief, which was not always clean, with which he made a sort of cushion for the key turned the teeth out of many a suffering mortal.

In 1766 Mr. John Woofendale was the first educated dentist in this country, having been instructed by Thomas Bedmore, dentist to Geo. III. He practiced in New York and Philadelphia and then returned to England.

The fathers and founders of American dentistry were Joseph Lemaire, a Frenchman, who was quite successful in transplanting teeth. He instructed some two or three persons. This was the first commencement in this country of educated dentists. Isaac Greenwood and son, John Greenwood, were the first dentists in Boston. John constructed the first artificial denture for George Washington. This was somewhere about 1784 or 1785. Josiah Flagg, one of of Lemaire's pupils, began business as an itinerant, and was properly our first American dentist. Dr. Flagg transplants teeth, cures ulcers and eases them from pain without drawing, fastens those that are loose, mends teeth with foil or gold to be as lasting and useful as sound teeth and without pain in the operation, and secures them in a lasting, indepedent and serviceable manner; sews up hair lips, and fixes gold roofs and plates, greatly assisting pronunciation and swallowing; cuts the defect from teeth, restores them to whiteness and soundness, without saws, files, acids, and such abusives as have shamefully crept into the profession, and have destroyed the confidence of the public. Sells by wholesale and retail, dentrifices tinctures, chewsticks, masticks, teeth and gum brushes, suitable for every age, complaint and climate, with directions for use.

James Gardette practiced in Philadelphia. He was one of the best early American dentists, he practiced forty-five years. The first plate with atmospheric pressure as a principle is attributed to him. He substituted gold foil for lead in the filling of teeth.

Dr. John Greenwood was the first, so far as is known, to pierce the maxillary sinus. He did this by removing a moler tooth and made the cavity or opening through its socket, and thus treated the disease and cured it. He became celebrated as a surgeon and is supposed to be the first in the United States to strike up a gold plate for the base of an artificial denture. He is best known as being the dentist to the President of the United States, George Washington. He made several sets for this eminent gentleman, one of which is now in the possession of Dr. John Allen of New York. This gentleman wore as a watch charm the last natual tooth of George Washington.

Time would fail us to speak of all the grand worthies who have contributed to make our profession what it is. We will just name them and hurry on. Horace Hayden, who published many papers on dentistry and gave a course of lectures to the medical students of the University of Maryland on Dentistry He petitioned the legislature of Maryland for a dental college with several others. He was located at Baltimore in 1804.

Edward Hudson, who practiced in Philadelphia, attained great eminence in the profession, and proved by his excellent work that the natual teeth could be saved. E. Parmley said we are more indebted to him than any other man, for his success and the importance attached to saving the natural teeth.

To John Randall, of Boston, we are indebted for the skill which he displayed in the turnkey and forceps, long before they were articles of merchandise.

Lemard Keocher, of Philadelphia, became so eminent in practice that his income was about $8,000 per annum. He picked up the business. His first case in Philadelphia, of simple extraction, occasioned him much embarrassment. He grasped the tooth with an instrument, shut his eyes, and turning his head from the patient made a strong effort which dislodged the tooth—he being mean while under such excitement that he knew not whether the tooth was out or the jaw broken. The patient assured him he had never had a tooth extracted so easy before. Keocher was so pleased at this triumph that he dates his success from this point. He published a work on Dental Surgery in London, 1826, and his treatment of the dental pulp has been accepted by the best authorities. From having no teachers he became a teacher, and is worthy of great credit and honor.

The growth of inventions and dental materials has been very great in the last century and our knowledge of theory and practice has had an equally healthy growth as a whole. From the most meagre beginnings great improvements have sprung The first teeth were human teeth, animal teeth, those of cattle and sheep, hippopotamus' tusks and teeth, elephant and other ivories, bone, etc. There were serious objections to all these, and then came the porcelain, which were plain white teeth, then the shading to match the natural teeth, with plain pins, which were bent, and the pins with heads. Many dentists displayed much art and skill in the early carved teeth. And it would well repay any one to read the history and growth of porcelain teeth.

Dr. Elias Wildman, of Philadelphia, began his experiments in 1837. He produced such results in life-like appearance as had not been obtained before and remain unexcelled to the present time. His principal success was in uniformity of gum enamel, to him must be the honor for reducing the manufacture of teeth to a scientific basis. We all know where the best teeth can be found at the present time. Bases have been of platinum, aluminum, tin, silver, gold, rubber and celluloid.

To Dr. Bean belongs the credit of the aluminum base, 1886. Dr. Geo. E. Hawes the poured tin base, 1850. To Edwin Truman the gutta percha base. To Nelson Goodyear the vulcanite base, 1851. To Messrs. I. S. Hyatt and J. W. Hyatt, celluloid, 1870. To M. L. Loomis' porcelain base, 1854. We all know the comparative value of all these and the survival of the fittest gold, platinum, vulcanite and celluloid. The methods of retaining dentures in the mouth by ligatures, clasps, springs and atmospheric adhesion will not require extended statement. The methods of pivoting we are all familiar with. And the best methods are the ones that live.

In taking impressions wax was the first used, then plaster and compounds. Swaging dies were made of zinc, lead and tin, the former being used.

The history of operative dentistry would take more time than our paper could do justice to.

Filling materials and instruments all have their inventors and special advocates, and all have some claim to notice if not merit.

The formation of dental societies and the establishment of schools to teach dentistry would all claim a share of recognition in this paper, which time will not permit.

The history of Anæsthetics is very interesting as telling how Dr Wells, of Hartford, in 1844 got his hint, which led to the new era in tooth pulling by nitrous oxide. Sulphuric ether, as introduced by Jackson and Morton, together with chloriform, are two of the anæsthetics that made their advent about the same time and have proved a blessing to the race. Local anæsthetics have some claim to notice but time forbids a history of them now.

The materia medica of dentistry has steadily grown from a few remedies up into the hundreds, and every dentist has a few standbys and lets the world wag on.

Extraction, transplantation and replantation have their advocates, and as the problem is not solved I will leave them as an open question, simply stating that the first two are among the first steps of dentistry.

In this paper I have been only able to casually look along the line of growth and see that as a whole it has been sure and healthy. We have made some serious mistakes and have taken some backward steps and have had many failures, but in spite of all this we are making advanced strides and are becoming a more learned and scientific profession.

Forty years ago we had no dental schools now we number nearly as many schools as years named. We have the best facilities that the ingenious brains of all nations can produce.

In many states we have dental legislation and laws. We have good dental literature and periodicals, and if we can believe the signs of the times we bid fair to be one of the leading and most useful professions. There are many worthies I have not mentioned, such as Parmley, Townsend, Harris, Arthur and a host of other good men who have gone on to get the rest of their reward. I am sorry that this paper is so fagmentary and incomplete, but from the nature of the subject it could not be otherwise.*

The December meeting was held at the office of Dr. LaSalle, who introduced the sudject of fees and fee-bills. The general impression seemed to be that fees concerned the individual and his own patients. As to a fee bill, few present would consent to be bound to any, whether high or low.

HURRY IS THE CAUSE.

The evils of hurry are manifestly among the causes of poor and inefficient work. From a habit of hurry some people, having, or imagining they have, more to do in a given time than can be done properly, grow confused, agitated and nervous; and, under this pressure, they proceed with the work in hand without the requisite deliberation and care, perhaps omitting parts of it (sometimes important parts), and producing at least an imperfect and inferior result, which can neither be permanent nor satisfactory. It is not too much to say that a large proportion of the unhappiness, the ignorance, the loss of property, and even the loss of life that is endured in the world is to be traced to the hurry and drive which characterize so much of the labor performed.—*Press and Printer.*

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*The credit of this paper is due to the Academy of Dental Science (Philadelphia) for its facts.—W. S. A.

A COURSE IN ANIMAL HISTOLOGY.

BY THOMAS G. LEE.
Lecture in Normal Histology, Medical Department Yale University.

188. **Non-striated Muscle.**—Smooth or involuntary muscle is found chiefly in the walls of the internal organs, as that of the stomach, intestines, trachea, bronchi, uterus, bladder, the larger ducts of many glands; in the skin, blood vessels, and in many other places.

Non-striped muscle is composed of spindle-shaped or fusiform cells, united by cement substance. Bundles of these fibres are separated by loose connective tissue. Every fibre is pointed at each end; often the extremity is branched. The middle thickened portion contains an oval nucleus. Faint longitudinal striations of the cell can be seen with a high power. These fibres are contractile in a longitudinal direction, and are surrounded by a delicate homogeneous sheath similar to the sarcolemma of voluntary muscle. The muscular cells vary greatly in length, .045–.230 mm. in different portions of the body. The bundles of fibres vary also in their arrangement, some anastomosing so as to form networks, other form continuous muscular membranes. From the mutual pressure of the fibres a cross section of a bundle presents a prismatic, rounded or flattened appearance.

189. **Cardiac Muscle.**—The fibres of heart muscle seem to occupy an intermediate situation between involuntary and voluntary muscle, resembling each variety in certain respects and again differing from them in others.

They resemble smooth-muscle in that the nuclei are in the centre of the fibre, that they have longitudinal striations and are involuntary. In having transverse striæ they are similar to voluntary muscle;

but the striæ are not so distinct and regular in the heart fibre. They differ from the other muscle fibres in having no sarcolemma, in the greater frequency of branching and the short prismatic fibres. The prisms are joined to each other by cement substance. In a cross section the fibres appear elongated.

190. **Striated Muscle.**—The volutary muscles are composed of striated fibres, which run parallel to each other, are held in place by loose connective tissue called endomysium, and are grouped in small bundles or fasiculi. These fasiculi, joined by large bands of connective tissue, the perimysium, form the larger segments of a muscle. The connective tissue contains the blood-vessels which form networks about the fibres.

The muscle fibres, as a rule, unbranched, are quite uniformly cylindrical in large muscles. The tapering ends of the fibres lie between the extremities of other fibres. The bundles of fibres end in tendon or thickened connective tissue.

A single fibre examined under the microscope exhibits an arrangement of alternate light and dark bands. The width of the bands varies with the state of contraction, the dark contractile disks becoming broader and thinner in contraction, and the opposite condition taking place in the light bands, or interstitial disks.

Surrounding each fibre is a delicate transparent sheath, the sarcolemma; and passing from this through each interstitial disk is a thin membrane called the membrane of Krause. In each of the muscle compartments thus formed is a contractile disk and on each side of it half of an interstitial disk. The contractile disks are composed of a number of short rods, the sarcous elements of which are held together by interstitial cement substance.

There has been described a dark transverse band in the center of the sarcous elements, the median disk of Hensen. In some fibres there is also seen in the interstitial substance near the membrane of Krause a row of dark granules.

The sarcous elements seen end to end give to the muscle fibre the appearance of longitudinal striation.

Between the sarcolemma and the muscle fibre are found at intervals muscle corpuscles. In lower animals they are also found in the substance of the fibre.

Striated muscle fibres are developed from mesoblastic tissue. The nuclei of fusiform cells divide, and then again divide, and are arranged in a linear manner in the substance of the cell; presently e [illegible] lengthens and becomes transversely striated.

NERVOUS TISSUE.

(*a*) Tease a bit of the sciatic nerve of frog in ¾ per cent. salt solution. Note in the medulated fibres the axis cylinder, medullary sheath and the incisures in it; also the nodes of Ranvier.

(*b*) Stain a bit of fresh sciatic nerve in 1 per cent. osmic acid for ten minutes; wash well in distilled water; tease and examine in glycerine. Note the darkly stained medullary sheath, the incisures and nodes, etc.

(*c*) Stain another portion of fresh nerve in ¼ per cent. of silver nitrate solution for five minutes; wash well in distilled water; expose to light till brown; examine in glycerine. Note the crosses of Ranvier, when the axis cylinder is stained at a node.

(*d*) Harden bits of nerve from larger animals in chromic acid or bi-chromate of potash solution; wash and stain with carmine or hæmatoxylon; cut in celloidin; mount in balsam. Note the epi-, peri-, and endo-neurium, the medulated fibres, etc.

(*e*) Stain sections of spinal cord with ammonia carmine, carmine anilin, blue or hæmatoxylon; mount in balsam. Note the fibres and the multipolar cells with their processes.

(*f*) Stain sections of cerebrum and cerebellum as in (*e*). Mount in balsam and note the cells and fibres.

(*g*) Stain the cornea of frog or other animal with gold chloride and note the terminal filiments of the nerve fibres as distributed among the epithelial cells.

(*h*) Stain a bit of the muscular wall of the intestine or bladder of frog with gold chloride and note the flexures of sympathetic fibres.

(*i*) Stain with chloride of gold bits of striated muscle, mount in glycerine jelly and note the end plates of motor nerves.

191. **Nervous Tissue** is of epiblastic derivation and the structures composed of it may be divided into three groups, nerve centers, nerve fibres, and the terminations of nerve fibres. The nervous system may again be divided into the central or cerebro-spinal, and the sympathetic systems.

192. **Nerve Fibres.**—These are of two kinds, medullated and non-medullated nerve fibres. The cerebro-spinal nerves are composed almost entirely of medullated nerve fibres, while the non-medullated compose the sympathetic system.

A cerobro-spinal nerve is covered by a thickened layer of fibrous connective tissue, the epineurium—this is a process from the dura mater. Contained in this are the blood and lymph vessels and usually fat tissue.

Within the epineurium the nerve fibres are grouped into bundles of various sizes, each bundle being enclosed in a laminated sheath derived from the arachnoid, the perineurium. The laminæ are covered on each side by endothelial cells and form delicate lymph spaces. The bundles may be simple or compound from having partitions from the perineurium pass between the fibres. The perineurium varies in thickness and is distributed to the fibres as they leave the nerve, in some places being laminated while covering a single fibre and known as the sheath of Henle.

Between the fibres in a bundle is a soft granular connective tissue ground substance, the endoneurium ; in it are found delicate fibres and connective tissue corpuscles; it is a continuation of the neuroglia.

The nerve fibre consists of three parts : (1) The axis-cylinder ; this is a delicate rod composed of very small parallelly arranged fibrils united by cement substance. The axis-cylinder varies in size in different situations. (2) The medullary sheath ; this consists of a series of tubes with imbricated ends. Each section is composed of a fine reticulum enclosing within it a fatty substance, neurine. (3) The neurilemma, a homogeneous elastic membrane, forms the external coating of medullated fibres except in brain, cord, optic and acoustic nerves. At intervals the medullary sheath is wanting and the neurilemma becomes connected with the axis-cylinder. These constrictions are known as the nodes of Ranvier, and the intervening portions as the internodal segments. In each of these, between the neurilemma and medullary sheath, is found an oval corpuscle, the nerve corpuscle, which is analogous to the muscle corpuscle. Medullated nerve fibres do not often divide, but when that occurs it is usually at a node of Ranvier.

Sympathetic nerve fibres, or fibres of Remak, consist of an axis-cylinder covered with neurilemma and enclosing nerve corpuscles at intervals. In sympathetic nerve bundles there are found medullated nerves ; non-medullated fibres are also found in bundles of the cerebro-spinal system.

193. **Nerve Centres.**—These consist of white and gray matter, the white being medullated fibres without neurilemma, the gray containing cells known as ganglion cells. The fibres and ganglion cells are embedded in a soft form of connective tissue called neuroglia ; in this substance there are fibrils which form a network and at intervals are found branched connective tissue corpuscles, the neuroglia cells.

The gangloin cells of the gray matter are contained in pericellular lymph spaces in the neuroglia. These cells vary greatly in size, those of the anterior horn of spinal cord being the largest. They vary also in shape, being oval, triangular or rounded, and giving off processes by which they are named uni-, bi-, or multi-polar. Each cell consists of protoplasm containing an intracellular network of threads, a prominent nucleus with capsule, and one or more nucleoli. Each cell has besides the other branching processes, one which is more slender than the others, and which has a distinct longitudinal fibrillation ; this is the axis-cylinder process, eventually taking on its sheathes. In the ganglia, as the sympathetic, the ganglion cells have a nucleated sheath continuous with the neurilemma.

THE METRIC SYSTEM IN A NICKEL.

It is claimed that our nickel five-cent piece hold the key to the linear measures and weights. The diameter of this coin is two centimetres, and its weight is five grammes. Five of them, placed in a row, will, of course, give the length of the decimeter, and two of them will weigh a decagramme. As the kiloliter is a cubic meter, the key to the measures of length is also the key to the measures of capacity. Any person, therefore, who is fortunate enough to own a five-cent nickle, may carry in his pocket the entire metric system of weights and measures.—*Exchange.*

BILL NYE ON JOURNALISTS.

Taking off the coat and vest and letting down the suspenders in order to write burning thoughts is gradually becoming more obsolete as women become more and more identified with journalism. A man may, if he will, just as easy sit erect, throw out his chest, and pull in his tongue, as to cultivate eccentricities and seek to attract attention by assuming odd attitudes while at work. I know a good, scathing writer who goes into his office about ten o'clock, locks the door, takes off most of his clothes, being wrapped up in thought most exclusively, sits on the fourth lumbar vertebra, braces his heels against the wall a little above his head, and as he works screws the nails of his boot heels into the hard wall harder and harder as he goes on. One day last summer, while working with unusual vigor on an editorial in relation to the ever-attractive, bright-eyed cancer in the Crown Prince's throat, he was surprised to see thirty or forty gold coins fall on his table like a blessed advance in his salary. Looking up he discovered that with his heel he had bored a hole into the vault of the First National bank, next room. Carefully poking back the money, he pasted a sheet of paper over the hole and marking it "Opened by mistake," put his heels against the drum of a light sorrel coal stove and went on with his work.—*Punxsutawney Spirit.*

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The next meeting will be held at Saratoga, N. Y., the first Tuesday in August.

PROFESSIONAL ANNEXATION.

[Response to Toast at Banquet of 5th, 6th, 7th, and 8th, District Dental Societies, at Syracuse, N. Y., October, 1888.]

BY DR. W. GEO. BEERS, MONTREAL, ~~ONT.~~ Que

Mr. Chairman, Ladies and Gentlemen:—I must confess to a good deal of embarassment in replying to a toast which is intended to be both professional and political, but I have been specially asked to do so by the chairman, and if I should offend any one, as I must say exactly what I think, I can only offer to settle on the spot by inviting you, as the boys say, to "come out in the alley!" I have neither the presumption nor the vanity to imagine that I am able to do justice to the personal and professional courtesies which doctor

Jonathan has always bestowed upon his Canadian friends, as well as to the magnificent ignorance—sometimes ill-nature—which senator Jonathan has recently lavished upon his Canadian foes. But I can assure you that not even the professional liars who supply the *New York Herald* with Canadian news ; or the wily politicians who eat forked-lightning for breakfast and dynamite for dinner ; not even the insane malice of men who hate Canada, as they hate Cyprus, because it belongs to Britain ; not even this can lessen the admirations Canadians have for the many noble and generous traits of character which belong to their American cousins.

I am sure I speak, too, for any brethern from loyal Toronto, when I say that we have to often been under deep professional obligations to the kind nature of the cousin we still, from custom, call " brother," not to know that, however we differ politically, you respect our national convictions as you wish your own respected ; and that as you choose to hit at us hard, you have enough of English fair play to take a drubbling back, and to allow the possibility of Canadians loving and defending the fame and good name of the Dominion, quite as much as you love and defend that of your Republic. 'No one more than loyal Americans would depise the poltroon who carries his patriotism in his pocket ; the disloyalty of the political parasite who would make patriotism a house of cards, and the dollars the chief end of the people ; intriguers who hiss out secession or annexation when they fail to get their political crimes or crotchets enshrined ; whose hunger for notoriety and power is a fever of their existence. I am sure that you could have nothing but contempt for any free people who measure their allegiance purely by commercial standards, and who, fearing to face the difficulties which meet every nation, turn peddlers instead of protectors of their national birthright. Just as you had and have your croakers and cowards we have ours, but, Mr. Chairman, Canada is not for sale !

There have been prophets like Goldwin Smith since the days of Elizabeth who have predicted England's decline within their time, but all the colonial greatness of England has been developed since the time of Elizabeth. We have, as you have, bitter partisans in the press and in politics who delight to foul their own nest ; who revel in the rain that destroys the crops, and who sincerely believe they can change the climate if they could change the Government. We have a few of those wise acres of society who assume to possess a monopoly of foresight, and who, like Caius Caligula, think the world would have been better made could they have been consulted.

But these people no more represent the convictions of Canadians than O'Donovan Rossa, or your fire-eating politicians and papers represent those of true Americans. I have no desire to hurt anybody's feelings here, but I hope I may be allowed to say something to to remove the infatuation too prevalent in the States that Canada favors annexation. Were we to judge you as you judge us—by the vaporing of the croakers, what value could we put upon your Union, and would we not feel like agreeing with Rossiter Johnson, who in his "Short History of the War of Secession" just published in Boston, thinks he sees in certain national circumstances the threatening elements of a second civil war? For years before the last civil war you had fire-eaters whose arrogance and vanity knew no bounds; who were advised by the Canadain press to study the elements of discord in the South instead of hankering for new ones in the North. It was just the same when years before that Georgia and Carolina appealed to arms and defied the general Government. Surely two threatened disruptions and one terrible civil war in the history of a century should be enough. But last 4th of July, I was near enough the "Reunion of the North and South" on the battlefield of Gettysburg, to see the ex-Confederates wearing the starred and barred badge, with the inscription upon it, "That was the flag of treason and rebellion in 1861, and it is the flag of treason and rebellion in 1888." I read the protests of General Wagner, General Gobin and the Quartermaster-General of the Grand Army of the Republic against the gush and glorification of rebels because they had been rebels. I heard one officer boast that Southern privateers had destroyed $500,000,000 of your property, and driven a quarter of a million tons of your shipping to make transfer to the British flag. I heard another gloat over the fact that they had nearly captured Philadelphia. I heard scores declare that they had not been beaten but starved. Reflecting upon all this, and hearing at this very hour the discordant echoes from that quarter, it strikes me that if Senators like Mr. Blaine are sincere in their effusive professions of patriotism, they could find a good deal to monopollze their genius down there in Dixie without meddling in the politics or the future of Canada.

Canada minds its own business, and does not worry itself over yours, though you have coddled and dry-nursed her enemies, and when she was at peace with you, allowed a horde of your citizens to invade her. Frankly I may say, that while I believe Canada has been a fair neighbor, too often she has not found her cousin one.

If for once in the Treaty of Washington, remembering Maine, Oregon and San Juan, she did not let your diplomatists get the better of her, she felt she had given you at least a reasonable *quid pro quo*. During the civil war, we allowed your armed troops to cross from Detroit to Niagara on Canadian territory on the Great Western Railway; but during the Red River Rebellion of 1869, your Government refused leave to one of our vessels to go up the Sault Ste. Marie canal and arms and ammunition were transhipped at considerable delay. When the St. Albans raiders, unknown to us, entered your territory from Canada, your Government was asked for its bill of damages, and it was paid. When the Alabama claims bill was presented, it was paid so well that, years after every possible claim was settled, your Government retains a large balance which should have been refunded to Britian! What about the damages done to Canada in Canada by your citizens during the Fenian raids, most of them wearing the uniform of branches of your national troops? Not a cent has been paid. You expected Canada to know that a few quiet and straggling Southerners intended to raid St. Albans; you thought that England should have known that a solitary cruiser intended leaving one of her ports to prey upon your commerce. But what a splendid display of reciprocal consistency, that thousands of armed men should openly muster and drill in your chief cities for months before; openly occupy your border towns and villages, and attempt to invade us, and your Government comparatively oblivious! In the face of these facts, it is not easy to swallow the statements or believe in the honesty of public men who talk of the exactions and encroachments of a people of 6,000,000 upon a people of 60,000,000. Canada cannot be coerced or forced into union with such examples of political hypocrisy.

There was a time, twenty years ago, when we were diconnected provinces; when Canada proper contained only 370,488 square miles; when we had few railways; when stagnation seemed to mark us; when we had no winter outlet of our own to the sea; when our great Northwest was a great unknown. Even then annexation was unpopular. There had not been enough accomplished then by Canadian statesmen to make their rivals envious, and your own statesmen did not dream that we could build a railway to connect the maritine and the old provinces, or that with a population of only 6,000,000, we would dare to span the continent with another, a work not accomplished by the States until they had 50,000,000. But can you be deceived into the belief that confederated Canada is now for sale, when since confederation twenty years ago our revenue or consolidated fund has immensely increased ; when our shipping and its tonnage has more than doubled—young Canada standing fifth on the list of nations ; having more vessels than old France, Spain, Italy or Russia ; when the assets of our chartered banks, the value of our imports, the extent of our exports tell a story of our marvellous progress ; when instead of about 2000 miles of railway in 1867 we have now over 14,000, giving us a greater length of mileage than any other part of the Empire excepting the United Kingdom and India ; when the Canadian Pacific Railway has established a line of steamers between Vancover and Hong-Kong and Japan, and our great Canadian line has become of imperial importance ; when we have developed our inexhaustible fisheries, thanks to your abrogation of the Reciprocity Treaty, so that we have 75,000 hardy men sailing our vessels and otherwise engaged in the business, and for 1887 we valued those fisheries at $20,000,000 ! Can you wonder that annexation, as a serious subject, has received its doom, and that in spite of the intoxication of senatorial conceit on the one side, and the croaking of malcontents and political tramps on the other, Canada is loyal to the Mother Country, from whose stout old loins both of us sprang? Confederate Canada, respected Canada, loyal Canada, progressive Canada is a personal and political insult to the sore-head parties who opposed confederation, and who would welcome annexation to Turkey or Russia were we neighbors, or rejoice at annihilation rather than live the agonizing life of seeing their prospects and predictions destroyed. There were millions of your own citizens glad to do their worst to dismember your union ; there were thousands who gave their lives to wreck the Republic that their own state interests might be promoted. Yet when a few obscure cranks in Canada declare in favor of annexation, you think they speak the sentiment of a sober people who do not find it necessary to indulge in the spectacular or the rhetorical that you may see and hear the truth. You choose to ignore the treason of many a Southern newspaper to-day as you did twenty-five years ago, and you exalt as gospel thepartisans of the Canadian press, who are incapable of telling the truth.

Personally and professionally, I am sure any dentist who visits you forgets he is not an American, and I am sure we try to make Americans coming to Canada forget they are not Canadians. You have big and hospitable hearts that were intended for hospitality and not for quarrel. Personally and even commercially we can find so many points of common agreement, that we should overlook the few where we must agree to differ. Politically, I realize I am a foreigner here the moment I cross the lines. I am at home when I land at Liverpool, at Glasgow, at Dublin, at Bermuda, New South Wales, Victoria, Queensland, New Guinea, Jamaica, Barbadoes or Trinidad. Politically I have a share in, and am proud of, the glorious old flag which waves over New Zealand, Australia, Gibraltar, Malta, Hong-Kong, West Africa, Ceylon, St. Helena, Natal, British Honduras, Dominica, the Bahamas, Grenada, Barbadoes, India. England is an old and apt master in annexation. Since she lost the thirteen colonies here, she has annexed colonies far greater in area and population, of far more value to her than if they were joined to her three great kingdoms, while Spain, Portugal, Holland and France have lost theirs, and there is little or nothing left for any other nation to annex. I need no other political passport to the rights of a a British subject, and the citizen of a great realm, comprising sixty-five territories and islands, than my Canadian birthright. I do not measure my national boundary from the Atlantic to the Pacific, but from the Pacific to the Caribbean Sea.

Under the reign of Victoria no Canadian need be ashamed to belong to an Empire which embraces a fifth of the habitable globe, and to know that his own Dominion forms nearly a half of the whole; an Empire five times as large as that which was under Darius ; four times the size of that under ancient Rome ; sixteen times greater than France ; forty times greater than United Germany ; three times larger than the United States ; Australia alone nearly as big as the States; India, nearly a million and a quarter of square miles; Canada, 60,000 miles larger than the States, without Alaska ; and 18,000 square miles larger with it ! An Empire nearly 9,000,000 of square miles, with a population of 310,000,000. Sharers in such a realm ; heirs to such vast and varied privileges, Canadians are not for sale. Political annexation must then remain a bug-a-boo for disappointed politicians on our side to play with, and a bubble for certain Senators on this side to blow to decoy their innocents and fanatics at home. But there is an annexation we favor, that of brotherly friendship and political good-will. You have 54,000,000 the start of us. Are you the Goliath afraid of Canada as a political David ? Canada has been a good neighbor. When Lincoln and Garfield died, the Dominion was in mourning. Whenever any of your men-of-war come into our ports, the citizens rejoice, and give your men the hospitalities of the cities. There are constant reciprocity treaties being made every day in the year between us and the altar of Hymen. At many of our banquets the toast of the President follows that to the Queen. At most of our public gatherings, your flag entwines ours. From most of our pulpits prayers are offered for your ruler as well as for ours. That is the sort of alliance we do more than you do to promote. We want, too, fair commercial reciprocity, but we shall not take commercial union for it, or bend our necks or our knees for either. Whatever betides, we can both be loyal to our own political countries ; we can both be fair even to our own national and natural prejudices, and while Canadians may neighborly pray, 'God bless the Republic," may you not in as friendly a spirit reciprocate with "God save the Queen."

ON THE EVOLUTIONARY LOSS OF THE LITTLE TOE.

If thou must go, thou feeble, foolish digit,
  Fain would I speed thy slow, degenerate way ;
I daily feel a disagreeable fidget
  Whenever I've occasion to display
Thy doubtful outline, and thy form chaotic,
Born of a taste in boots, perhaps erotic.
  Thou art a shock to my æsthetic sense,
  And offerest no kind of recompense
In way of use ; of every function shorn,
Except to act as basis for a corn.
When thou art gone I'll still maintain my grace,
  Still walk erect wherever I may be ;
Still I'll belong to the athletic race,
  Waltz with the fair, and kick mine enemy !
So peace ye Schopenhauers, and peace ye Mallocks,
When I've acquired a hypertrophied hallux,
  To monodactyle type thus simplified,
  Life shall be simpler, too, and so beatified.

When future science forgets thee in thy prime,
Methings a great mind from a northern clime
  May then discuss thy remnants, and declare
  He finds a true prophetic organ there !

—*Guy's Hospital Gazette.*

RUDIMENTARY VERSUS NASCENT ORGANS.

On the theory of Natural Selection there is a wide distinction between rudimentary organs and what you call germs of organs, and what I call in my bigger book "nascent" organs. An organ should not be called rudimentary unless it be useless—as teeth which never cut through the gums—the papillæ, representing the pistil in male flowers, wing of Apteryx, or better, the little wings under soldered elytra. These organs are now plainly useless, and *à fortiori*, they would be useless in a less develped state. National Selection acts exclusively by preserving successive slight, *useful* modifications. Hence Natural Selection cannot possibly make a useless or rudimentary organ. Such organs are solely due to inheritance (as explained in my discussion), and plainly bespeak an ancestor having the organ in a useful condition. They may be, and often have been, worked in for other purposes, and then they are only rudimentary for the original function, which is sometimes plainly apparent. A nascent organ, though little developed, as it has to be developed must be useful in every stage of development. As we cannot prophesy, we cannot tell what organs are now nascent; and nascent organs will rarely have been handed down by certain members of a class from a remote period to the present day, for beings with any important organ but little developed, will generally have been supplanted by their descendants with the organ well developed. The mammary glands in Ornithorhynchus may perhaps be considered as nascent compared with the udders of a cow—Ovigerous frena, in certain cirripedes are nacent branchiæ—[in illegible] the swim bladder is almost rudimentary for this purpose, and is nascent as a lung. The small wing of penguin, used only as a fin, might be nascent as a wing; not that I think so; for the whole structure of the bird is adapted for flight, and a penguin so closely resembles other birds that we may infer that its wings have probably been modified, and reduced by natural selection, in accordance with its sub-aquatic habits. Analogy thus often serves as a guide in distinguishing whether an organ is rudimentary or nascent. I believe the os coccyx gives attachment to certain muscles, but I can not doubt that it is a rudimentary tail. The bastard wing of birds is a rudimentary digit; and I believe that if fossil birds are found very low down in the series, they will be seen to have a double or bifurcated wing. Here is a bold prophesy!—DARWIN TO LYELL, *Life and Letters*.

CLOTH STRIPS FOR POLISHING.

Dr. Charles T. Howard has just put on the market four grades of strips for finishing or polishing proximal fillings and surfaces, that should be given a trial by everyone capable of appreciating a good thing. Their points of superiority are extreme thinness combined with great strength, while possessing to a high degree the other qualities necessary in good strips. They are made in four grades—coarse, medium coarse, medium, and fine; and in three widths—broad, medium and narrow. The samples are medium width. They are put up in packages containing an amount equal to one gross of medium width, and at fifty cents per package. To be had of dealers, or direct from the manufacturer, whose address is Rochester.

LIST OF COLLEGES OF THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS:

1. Baltimore College of Dental Surgery, Baltimore, Md.
2. Boston Dental College, Boston, Mass.
3. Chicago College of Dental Surgery, Chicago, Ill.
4. Harvard University, Dental Department, Cambridge, Mass.
5. Kansas City Dental College, Kansas City, Mo.
6. Minnesota Hospital, Dental Department, Minneapolis, Minn.
7. Missouri Dental College, St. Louis Mo.
8. New York College of Dentistry, New York City.
9. Ohio College of Dental Surgery, Cincinnati, O.
10. Pennsylvania College of Dental Surgery, Philadelphia, Pa.
11. Philadelphia Dental College, Philadelphia, Pa.
12. St. Paul Medical College, Dental Department, St. Paul, Minn.
13. University of California, Dental Department, San Francisco, Cal.
14. University of Iowa, Dental Department, Iowa City, Ia.
15. University of Michigan, Dental Department, Ann Arbor, Mich.
16. University of Pennsylvania Dental Department, Philadelphia, Pa.
17. Vanderbilt University, Dental Department, Nashville, Tenn.
18. Northwestern College of Dental Surgery, Chicago, Ill.
19. Louisville College of Dentistry, Louisville, Ky.
20. Indiana Dental College. Indianapolis, Ind.
21. Dental Department of Northwestern University, Chicago, Ill.
22. Dental Department of Southern Medical College, Atlanta, Ga.
23. Dental Department of University Tennesse, Nashville, Tenn.
24. School of Dentistry of Meharry Medical Department of Central Tennessee College, Nashville, Tenn.

PAY UP.

"THE man who has received more thought from his profession than he has given it is in debt, and should pay up. And if all such would do it the periodicals would overflow with orginal matter."

So says Dr. Watt, and he's been in this thing up to his ears long enough to know whereof he speaks. Much, perhaps most, that appears in dental periodicals is "rehash," or better still, "rot;" but so too is much, perhaps most, that appears in the republican *Tribune*, the democratic *World* and the mugwumpian *Times*, all of New York, There are worse publications, lots of them, than those of the dental profession.

ST. LOUIS DENTAL SOCIETY.

Officers for 1889 are: President, Dr. A. J. Prosser; Vice-President, Dr. J. Warren Wick; Recording Secretary, Dr. Jessie E. Groscheider; Corresponding Secretary, Dr. William Conrad; Treasurer, Dr. Henry Fisher; Publication Committee, Drs. Keith, Harper and Vernon; Committee on Ethics and Elections, Drs. Newby, Morrison and Fuller. There were seventeen (17) meetings held and fourteen (14) papers presented during 1888.

PRINCIPLES—CONSERVATISM.

BY B. W. W.

In the course of a clinical lecture before the students of the Philadelphia Dental College, Prof. Garretson related the following: When I entered the University of Pennsylvania, in '52 or '53, almost the first thing I noticed was a magnificent bust of that great surgeon and lecturer, Jean Paul Richter. I gazed in admiration, and underneath I noticed these words, Principles! Principles!! Principles!!! and they sank into my soul as nothing had ever done before. Upon this one thing was founded his great success as a surgeon and lecturer, and it is this I, a humble follower in his footsteps, would teach.

I also recollect my first visit to Philadelphia. I gazed at the sights with open mouth wonderment. Although but six years of age I had learned to read, and as I walked up Market street, holding the hand of my father who was dragging me along, I noticed a sign reading, "Stoves for sale." There may not have been anything grand about this particular sign, but in the country where I lived they did not have many signs—perhaps an old rusty stove was placed in front of the store and served for an advertisement at any-rate that sign was finer than any I had ever seen before, and I kept looking at it. As we came up in front of the store, of all queer things that had ever occurred, the sign changed and read, "Economy of fuel." I kept looking at the sign, my father dragging me along, and as I looked back the sign had again changed and read :

"Be not the first by whom the New is tried,
Nor the last by whom the Old is laid aside.

This precept sank into my soul and from that day to this I have never forgotten it. It shows what little things may influence our whole lives as these two incidents have influenced mine.

CHICAGO—25th ANNIVERSARY.

The Chicago Dental Society will celebrated its 25th anniversary by a three days meeting at the Grand Pacific hotel, February 5th, 6th and 7th.

Papers will be read by Drs. Thompson, Pruyn, Weeks, Patrick, Martindale, Black, Andrews and Comstock.

Clinics will be held Wednesday and Thursday mornings, at 9 o'clock, in the Chicago College of Dental Surgery. The list includes some of the best known men in the profession.

SOME FABLES.

BY A LADY CONTRIBUTOR.

A Hollow Groan, out of an occupation, on meeting a Lone Traveler by night in a dismál wood, attempted to terrify him.

"Don't put yourself out of breath, my friend," said the Traveler, "I'm not in the least frightened. 'Direness, familiar to my slaughterous sense, cannot once start me.' I am a Leading Dentist on my vacation, and your familiar tones just cured me of a slight spasm of homesickness in this gonesome spot."

Laughing heartily, he clapped the Groan upon the shoulder, who, much disconcerted, subsided into a feeble wail and expired.

* * *

A number of unpleasant sensations of diverse complexion, peripherally initiated by the unwelcome presence of a heartless Rubber Dam, rallied their courage, and upbraided him as a cruel monster.

The Rubber Dam merely remarked, with a cynical sneer, "If you do not like my company, why not leave it ?"

Fabula docet: It is often futile to reason with those who are qualified by the nature of the case, to get the best of the argument.

A Lady Comer was often annoyed by a scornful clock, which pointed contemptuously and superciliously to the lateness of the hour. One day the former lost his patience, and hastily catching up a heavy pair of universal lower molar forceps which chanced to be near by, hurled them with such force at the clock as to shatter it to fragments.

There seems to be a sort of moral hovering in the air, but it eludes capture.

DIED.

At thousand Island Park, September, 1888, Jane Elizabeth, wife of Dr. Stewart B. Palmer, of Syracuse, N. Y., aged 59 years.

PELLETS.

Time flies—and through no fault of hours,
But just for instants. I'm
Convinced, with all his flying powers,
There are no flies on time.
—*Life.*

IRON rust is removed by salt with lemon juice.

A FUNNY paper speaks of surgeons' fees as cutting rates.

DRUG men are now known as "Knights of the Mortar."

A little molasses upon a mustard draft will prevent blistering.

"DOCTOR, what do you do in case of gone stomach?"
"Advertise!"

A bit of soda dropped into the cavity of an aching tooth will afford relief (sometimes).

LOOKING then at the physics of the question we see that the formation of a vegetable is a process of winding up, while the formation of an animal is a process of running down. This is the rythm of nature as applied to animal and vegetable life.—TYNDALL.

THERE are over 200 students at the Philadelphia Dental College, eight of them ladies.

THE attendance at Syracuse did not fall many short of 250—certainly a large gathering.

THE Chicago Dental Society will celebrate its 25th anniversary the 5th, 6th and 7th of February.

FRANCIS DARWIN, editor of his father's *Life and Letters*, has been elected reader in botany at Cambridge.

AND now the cats have it—they're spreading diphtheria in some parts of London. Bootjacks also mark their trail.

Life tells of the case of a dentist who tried to fill the teeth of a buzz saw. The coroner pronounced the operation a success.

LIKE others we are indebted to Dr. R. I. Pierson, Kansas City, for a copy of his appointment book. It is most compact and convenient.

"THERE is a good deal more in dental surgery than cohesive and non-cohesive gold," says Editor Catching, and don't let us forget to remember it.

THE Odontological programme, for January 15th, calls for the inevitable "Incidents," also "The New Epoch in Medicine," by Dr. Robert Ormiston, of Brooklyn.

GENERAL COX has resigned as chancellor of the Cincinnati university on the ground that the money paid him as salary can be better expended for apparatus and library.

THINK of that paper for your district society meeting in April or May, also for the State society meeting in the latter month. "A name and fame await thee at the door."

ACCORDING to Darwin, it was remarked by Quetelet in respect to evidence of curative processes, that no one knows in disease what is the simple result of nothing being done.

DR. ATKINSON says "he never kills babies for the sake of having a funeral." Mighty glad to hear it too. What queer things a feller will say when sure the other man has no gun.

Dr. Silk's article, a part of which appears on another page, bears out Dr. Atkinson's old-time and all-time claim—"Privity of oxygen, gentlemen, simply privity of oxygen."

"Mrs. M. W. J." is receiving most complimentary notices of her work at dental meetings and in dental periodicals. We don't know what her other name is, but it means "Good report."

A girl had her corset torn off by a stroke of lightning, and escaped, but her young man had his right arm shattered and a piece of corset steel blown into his liver. He didn't know she was loaded.

When standing resolutions become as numerous as in the case of the National Association of Dental Examiners, they should be "incorporated." They are like too much hair on a dog's tail.

Prof. Stellwagen gave the boys of the Philadelphia a "feed" Halloween. About 150 "honored" him with a demonstration of the almost self-evident fact that some natures abhor a vacuum.

Editor Whelpley of *Meyer Brothers' Druggist* has had to take a turn at "Don't." He worked in an even hundred; but as they were all aimed at druggists the rest of us have little cause to complain.

The special committe of the State Society has "testimonialed" Dr. Wm. Carr, of the Law Committee and Dr. E. Savery of Assembly, for their successful efforts in behalf of the latest addition to the dental laws of New York.

"Good, kind-hearted soul that she was," said Job Shuttle as he mused on the excellencies of his better-half, long since passed away. "If I don't meet that woman in heaven, I hope I shall miss her in the other place, that's all?"

It is announced on the authority of an "eminent physician," that it is not healthy to rise before eight o'clock in the morning. This applies only to men. Wives, according to the same e. p., can rise at seven and start the fire as heretofore.

A professional friend who is always "up to something," has inlaid a table with human teeth—the accumulation of the extracting room for years. The grinding and polishing of the whole surface has brought out some unlooked for and novel effects.

HARVARD graduates for '88 number six, three of them from the States, one from Germany and two from England. Total number of graduates to date 156, twenty-eight of whom are credited to other countries than ours.

CUSTOMER (getting his hair cut)—"Didn't you nip off a piece of the ear then?"

Barber (reassuringly)—"Yes, sah; a small piece; but not 'nough to effect de hearin', sah."—*Texas Siftings.*

IN our discussion of the treatment of pulpless teeth, isn't it more than likely that we go too far when we say "we do this to kill the spores and germs?" We know some things; but when we assume lets say so. It sounds better, at any rate.

WAVES may change to ripples, and ripples to waves—the flux of power is eternally the same. It rolls in music through the ages, while the manifestation of physic life, as well as the display of physical phenomena, are but the modulations of its rhythm.—TYNDALL.

CANADA was well represented at Syracuse—Drs. Wilmott, Cæsar, Roberts and Snellgrove, of Toronto, and Beers, of Montreal. They made themselves heard too, Drs. Beers and Wilmott at the banquet, and all of them elsewhere. "Elsewhere" is a little indeffinite, but that tells it.

THE first district society carried through another of its elaborate monthly programmes, Tuesday, January 8th. The afternoon was devoted to clinics, the evening to the reading and discussion of "Our Situation, or the Dentist as a Thinker," by Dr. A. G. Bennett, of Philadelphia.

A German chemist of Nuremburg reports great success in using glycerine together with glue. Generally, after the drying of the glue, the article to which it is applied is liable to break, tear or spring off; but if a quantity of glycerine equal to a quarter of the glue be mixed with it that defect will entirely disappear. He also made use of this glue for linen, leather, for making globe frames and smoothing parchment and chalk paper. The glycering has also some properties in common with India rubber, for it will blot out pencil marks from paper so as to leave no mark whatever.—*Press and Printer.*

ACCORDING to the *Dental Record*, "The World says Emerson is nowhere nailed up in boards, but is open to all if we will but open our eyes." Some mistake here. Emerson is dead, and in boards nailed or screwed. More than that we don't believe the *World* said anything of the kind.

THE *Dental Record* for November, for the first time in its history, appears without the familiar name of its editor, Dr. Thomas Gaddes. Work in other and distant fields made his resignation imperative. His successor will have to labor long and hard to improve on the *Dental Record* as we have learned to know it.

DARWIN, writing to a relative, Rev. W. D. Fox, in '52 says: "What a blessed discovery is chloroform. When one thinks of one's children it makes quite a little difference in one's happiness. The other day I had five grinders (two by the elevator) out at a sitting under this wonderful substance, and felt hardly anything."

DR. HEINRICH HOFFMAN, of Berlin uses the ballet to teach the average student in chemistry the constitution of organic compounds. Each girl represents an atom, and the grouping of the atoms is said to be very effective. For some not readily explained reason, every student in Berlin feels it his duty to take chemistry first, and front seats if he can.

ACCORDING to the programme of the First District Dental Society, for November, Dr. Horace Dean, of Newark, N. J. was to have described "Electricity and Sulphur in Dentistry." The title is not only new but "taking." Many await its publication impatiently. The clinicians announced for the same meeting were Drs. Ottolengui, Dean, Rhein, Ivory and Clark.

"OUR Esteemed Contemporary," Brother Patterson, of the *Western Dental Journal*, is tearing his hair on account of our address. Well, brother, just tear on, when you cease to look at things from a personal stand point, you will agree with us. It may be by that time, you will have a little "notoriety."—*Southern Dental Journal*. Still at it with no prospect of a let up.

"THE RECORD" is the name of a neat publication, by and in the interests of the Students' Society of the New York College of Dentistry. The first number (October, '88) contains the president's address, several papers with discussion, and items of interest to present and prospective collegians. To publish or not to publish is said to be the question now agitating the boys at other schools.

To DISTINGUISH carbonates from bicarbonates is sometimes desirable. A writer says that in order to do this add a drop of phenolpthalein solution to a carbonate, and it will be turned to a bright red, but with a bicarbonate there will be no change of color. I have prepared test-papers which are very convenient; they will detect one part of K_2CO_3, in 1,000 parts of water.

HAVE you a difficult case on hand—one that calls for gum teeth not in manufacturers' stock? Then set up plain teeth, grinding them into desired forms if necessary, fill out the gum part with wax, and send the model to Dr. Eccleston, Oxford, N. Y. In due time you will receive in return a bit of work in porcelain that will do you good to look at, and make your patient your everlasting debtor.

AT a recent clinic, Prof. Brinton said that an attendant of lithotomy is dryness of the surgeon's mouth, similar to that produced by belladonna; and Prof. S. D. Gross remarked: "It is peculiar to the operation for stone; I have often felt it." A thesis showing the relation of a stone in one man's bladder to the salivary glands of another man would probably take the Lea prize.—*Exchange.*

Dr. M. Chas. Gottschaldt, New York City, says: "Those having trouble with the sand-paper or corundum disks catching the rubber dam while using them, will find the following of advantage: Keep a cake of toilet soap on the operating stand, and before using the disk, run the edge once or twice over the dry soap; this will give a smooth edge, which will glide over the dam without any trouble."

OBSERVER BILL NYE's report on Western New York weather for three months ending January 1st, reads as follows: 'The weather here has been fair but threatening on the upper coast, with brisk to balmy winds combined with tropical snow storms and changing to muggy deposits of sleet as far north as Beacon street, followed by cold thunder storms, lowering weather, succeeded by rising barometer, sunstrokes and sleighing. The wind has been variable to fresh, with threatening atmospheric disturbances, shifting form fair to middling and to briskly soft winds, then back to softly brisk winds, sky warm to bright, with eager winds, variable to partly changeable again. Mildly tempestuous, with mackerel sky and slightly threatened change in the weather itself.

WANTED—A MICRO-SPECTROSCOPE.—Sometime since we advertised in these pages for a heliostat, but so far without success. Now we offer to purchase at a reasonable figure a first-class micro-spectroscope. There are a few of these instruments in this country and all, we believe, of foreign make, and probably worth their weight in brass. If, however, there is a good one to be had we should be pleased to pass upon its merits, and perhaps purchase.

The observations of Constantin Paul, on the uses of sacharine, as quoted by Tahlberg, List & Co., are: That it is antiputrid, 1 : 200 preventing the ammoniacal decomposition of urine ; it is antiseptic, 1 : 200 to 1 : 500 hinders the growth of various bacteria. As a sweetening for lemonade, etc., for diabetes it is useful; and a teaspoonful to three ounces of water of an alkaline, six per cent. solution of saccharin makes an excellent mouth wash.

Dr. W. H. Morgan, Nashville, says the vitality of the dentine depends almost entirely upon the pulp, and if you want to destroy the tooth, is a good way to devitalize the pulp. As far as he understands it, it is always best to preserve the tooth as nearly vital as possible. We think Dr. Morgan scarcely appreciates the condition of affairs or the anatomy of tooth-structure. The dentine of the tooth has little, if anything, to do with the physiological relation of the tooth to the jaw.—*Western Dental Journal.*

Dr. J. E. Cravens, Indianapolis, says, on the question of pulp devitalization or destruction, that the pulp, from the time the tooth is completed, labors unceasingly to accomplish its self-destruction, either by filling up its chamber—progressive calcification—or by exostosis—constriction. The more he studies and the more sections he makes, the more firmly he is convinced that the pulp is of very little essential service after the tooth is completed. Just so, but when may it be said "the tooth is completed."

"Headache from Eye-Strain," our leading article this quarter, deals with a subject that concerns every man who suffers from headache, or who has professional relations with others who suffer constantly or occasionally from the same malady. Eye-strain may not be the cause, but Dr. Rider's paper discusses the subject from so practical a standpoint that it becomes everyone at all afflicted to take that into close consideration. Dentists lose much time because of headaches, of their own, or on account of headaches on the part of their patients. Some of these patients may be wearing glasses, but the question occurs, "Were they prescribed by a competent occulist, or were they fitted at a glance by some super-human shoptician?" Dentists can do no greater good to such than in suggesting eye-strain as a cause of headache, and referring them to some one competent deal intelligently with defects in this most important organ.

At the Syracuse banquet Chairman Palmer read letters from Drs. E. P. Brown, F. X. Sudduth, Frank Abbott and others, and then introduced Judge Northrup who responded to the toast "The Bar." Dr. Marshall read a letter from Dr. Didama in response to "The Medical Profession." Dr. D. was too ill to respond in person, so contented himself with a command to Peter to rise, slay and eat. "The Pulpit" was spoken for by Rev. Dr. Mundy. Dr. Straw, "Old Neptune," New York's own and only third term president did the state good service. Dr. Rogers should have spoken for "mine host," the Fifth, but had to leave before his time. Dr. Downs answered for the Sixth, Dr. Howard for the Seventh, Dr. Barrett for the Eighth. Dr. Wilmott set out the "Dental Profession in Canada," in good form, while Dr. Beers spoke his mind in the best speech of the evening when he laid hold of "Professional Annexation." "The Coming Dentist," and a recitation ("The City of the Living,") constituted Dr. Dwinell's contribution to the feast. Mr. Seward of the local press presented the case of "The Dentist's Patient" with such feeling that the lights went out twice. He had never talked like that before. Drs. Brophy, Curtis and others responded briefly and a most enjoyable evening was brought to a close.

BOOKS, PAMPHLETS, ETC.

The Scoville Manufacturing Company have just added another volume to their long list of photographic publications—*The American Annual of Photography and Photographic Times Almanac for* 1889. It contains several articles on photo-micrography, of which at least one ought to interest those of the profession who are now working, or even playing, at this adjunct to the study of dental histology and dental histological teaching.

The article in question bears the headline, "Large *vs.* Small Negatives in Photo-Micrography," by Geo. W. Rafter, C. E., a gentleman, many of whose papers have appeared first in the ODONTOGRAPHIC JOURNAL, and several of which have been largely copied by scientific periodicals, among them the *Journal of the Royal Microscopical Society.* Mr. Rafter maintains that the photographic limit should be the amplification at which the object is best seen microscopically, and that the negative mode under these conditions, and these only, should be the basis of further enlargement. In formulating this rule he has given some shadow of reason to the photographers of bacteria and other minute forms, for what they have done as convenience or as the necessary outcome of imperfect photographic apparatus at hand.

A HANDBOOK OF DENTAL PATHOLOGY, BY ALBERT N. BLODGETT, M. D. Philadelphia: P. Blakiston, Son & Co. Pp. 279.

This is a neat volume dealing concisely with matters that the dental student needs much to know, and while it does not of itself teach him what to do, it gives him an excellent foundation on which to build, and suggests the sources from which applied pathology may be gleaned. Prof. Blodgett is one of the faculty of the Boston Dental College, and the book is a result of personal observation and experience with dental students and a full appreciation of their needs in this direction. It should be in the hands of every student.

THE INTERNATIONAL DENTAL JOURNAL.—This is the name of what was the familiar *I. P.*, edited by Dr. W. Xavier Sudduth, who will devote his full time and energies to making this what every good journal ought to be; and there need be no question that he will succeed if success is possible. It is independent, outspoken, owned by dentists, published for dentists, and edited by a gentleman theoretically and practically familiar with the needs of the dental profession, and whose time and talent will enable him to give in its pages all the good there is to be had.

Dr. Barrett, its editor while known as the *Independent Practitioner*, has earned a long rest from labor that simply added to time already fully occupied. When he assumed the editorship the journal was well nigh dead, but by dint of hard and intelligent work, he succeeded in giving it a name and influence rivalled only by the *Dental Cosmos.* He retires with credit and honor, but cannot help but be a little solicitous as to the future, which is just and pardonable in anyone who has made a success of a venture and then passed it into another's keeping.

We congratulate all concerned on what seems to be a happy combination of men and circumstances.

Now *some* of us ought to feel good. The *International* has thirty-one of its sixty-four pages filled by three members of the dental profession who wear, each of them, "a badge of partial culture"—James Truman, D. D. S., W. G. A. Bonwill, D. D. S., and J. T. Codman, D. M. D. Those of us who wear this badge have every reason to be proud of *our* representatives. "Partial culture" seems to hold its own, and without very much effort. More !

While reading Dr. Truman's article on "Shock" in the *International*, we wished we might again "go to school" to him ; yea, even to examination, and be asked how we'd fill a diagonally-broken half-buried root with cylinders, and to answer that we wouldn't fill it at all, and hear him say, "I thought so." Reader, have you never been kicked ? No ? Then you'r not qualified to extend to us the hand of sympathy.

The *International* wants to know who'll play the *Review* organ. Never mind ; it'll be played, and soon, and perhaps by "The man who has no peanuts."

The American Monthly Microscopical Journal (how much we wish it would cut down its name) has undertaken a big work for 1889—keeping its readers informed up to date as to biology, bacteriology, medical microscopy, technique, bibliography, photo-micrography, etc., but the able editor and publisher, Mr. Charles W. Smiley, has promised to see it through, and all for a dollar a year. It is unquestionably the best periodical of the kind in this country. Box 630, Washington, D. C., awaits your subscribtion.

THE EMPEROR'S CANCER.—Sir Morrell Mackenzie has given to the public his revision of Emperor Frederick's case. The microscopy of it is interesting. A small tumor develops upon a vocal cord. A most eminent laryngologist excises a section of the tumor and submits the specimen to microscopic analysis by the most eminent pathologist of the world. He (Virchow) Opines that the tumor is not a cancer, but a wart. The progress of the case proves that the tumor was a cancer.

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